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Contractors *and* Engineers Monthly

Vol. 48, No. 9

SEPTEMBER, 1951

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C. & E. M. Photo

The unsung surveyor on page 1 at last! Bill Scroggins, unaware of our camera, sets up a level to check out forms for National Gypsum's paper mill in Oklahoma. See page 42.

● Soil Conservation

The experiment recounted on page 3 may mean a new agricultural economy for some 6,000,000 acres of coastal lowlands.

● Road and Sewer Tunnels

Tunneling detailed on page 5 will drop a U. S. highway out of a bad mountain snow belt and eliminate dangerous curves.

Tunneling reported on page 56 will complete a sewer line. It was a small job but a mean one, with running soils.

● School, Mill, Skyscraper

Key building in an air-base expansion program was a 2-story classroom and lab structure for trainees. Page 10.

Heavy concrete placing marked the construction of a paper mill for National Gypsum Co. Turn to page 42.

Foundation excavation for a Dallas skyscraper—see page 81—called for removal of 65,000 cubic yards of rock.

● County Road Program

A bond issue financed this one; consulting engineers supervised it. Page 15.

● Bridge Jacked Up

Seventeen feet it was raised to clear a newly created reservoir. Page 19 describes the delicate operation. Pictures.

● Maintenance-Men Meetings

The one we sat in on, part of a series, included a talk on employee training and movies on methods. See page 27.

● Hot-Mix Heyday

Contractors hop to it to lay 1,000 tons of hot-mix a day on the streets of a fast-growing city. Typical job, page 33.

● Handling Hard Ones

Who? Ed Gessner, Executive V. P. of Ewin Engineering Corp. Page 37 carries his Portrait in Print.

● Concrete Paving

U. S. 40 has become a dual concrete highway for 5 more miles in Maryland, thanks to the work covered on page 47.

● Road Program Pushed

And pushed through—after 3 defeats by legislators. For tactics, page 52.

● Water-Supply Dam

It's a 6,600-foot-long earth embankment with a steel-pile cutoff wall and a concrete spillway. Job story, page 62.

● Erosion Control

What's its status in the U. S.? How many states have programs more or less full-fledged? What are typical methods? Page 74 analyzes a C&EMonthly survey.

● Road Base Cement-Treated

California methods get a picture-story treatment on page 84.

● Airport Tops Mountain

Its 2 mile-long runways have a gravel subbase, a thick macadam base, and a hot-mix pavement. They will take 45,000-pound loads. See page 97.

● Highway Department Lab

This one had a humble beginning in 1925; now it has a home of its own on a university campus and all the equipment it needs for research and tests. Page 99.

(You will find "In This Issue" on page 4)

Covering the Field

For once we're not going to discuss Government orders, regulations, or controls, or anything remotely resembling them. We thought this month we might toss around some statistics instead, on the **progress of secondary-road construction since World War II**—hardly a more cheerful subject, but a change of pace anyway.

The U. S. government and the states have authorized \$2.04 billion for secondary-road construction in the postwar period. (We are indebted to the ARBA publication "Local Roads" for these and following figures.) Miles built into the system since the war amount to 53,766 at a cost of \$890.05 million. Another 22,648 miles are under construction, under contract, or programed—making a total of 76,414 miles completed or under way at a cost of \$1.37 billion. And another 40,000 miles can be built, at prevailing prices, with the \$668 million still unprogramed. In all, **we are building about 12,000 miles of secondary roads each year.**

Now the question is: **how many miles are wearing out each year?** Well, the Federal-Aid system now includes 640,753 miles, of which 234,486 are on the rural and urban systems and 406,267 are on the secondary system. The BPR has found that about 6 per cent of the 640,000-mile F-A system—or 40,000 miles—wears out each year. If we apply this rate to the 406,000-mile secondary system, we must deduce that about 24,000 miles of it are wearing out each year. Yet we are building only 12,000 miles each year. **We are, in fact, replacing only half the mileage that wears out each year** (not to mention the mileage that is inadequate). In other words, we are going up on a down-moving escalator—and losing ground fast.

As a further pessimistic footnote: The Interstate Commerce Commission says that **4,000 accidents occurred at highway and railroad grade crossings in 1950**—or 13.5 per cent more than in 1949! And they were more serious. Deaths totaled 1,576—a 4.6 per cent increase—and injured persons totaled 4,368—a 15.7 per cent increase.

Gloomy statistics about our highway system are scarcely news these days. Far more newsworthy always is the something being tried or done to better them, and that something nowadays is very often bond financing. Take Oklahoma, for instance.

Of the \$63 million in road-user taxes collected by Oklahoma in 1950, only \$21.8 million or 33 per cent ever reached the Highway Department. State Highway Director C. A. Stoldt has criticized this annual diversion, saying that it has blocked efforts to provide an adequate highway system. Like many other states, **Oklahoma is now turning to bond financing** as a solution. Tired of a patch-on-patch highway policy, the state has launched a **survey to spot every trouble point on its roads**—elevations susceptible to floods, outmoded bridges, substandard underpasses and overpasses, dangerous curves and intersections, narrow pavements, inadequate shoulders, the whole kit and kaboodle. When the cost of eradicating substandard construction and death traps is computed, Governor Murray hopes to call an extra session of the legislature to refer a bond issue to the voters. He would retire the bond issue from road-user taxes especially earmarked for paying off the debt. He estimates that an issue of \$100 million would finance the improvements, though legislators have expressed the opinion that considerably more will be needed. In any case, Oklahoma's whole-hog approach is sure to be watched with interest.

Apropos of this whole subject of financing, have you read the Owen and Dearing book yet, "Toll Roads and the Problem of Highway Modernization" (The Brookings Institution)? If not, it's worth top place on your fall reading list.

NEWS AND VIEWS

of the construction industry at home and abroad — postwar progress of secondary-road construction, trend toward bond financing.



Somewhere in Korea, Air Force engineers with Caterpillar diesel tractors and motor graders complete an airstrip. Planes start using the strip even before earth-moving comes to an end.



A hard-hat salute as American Bridge Co. workmen raise the flag atop Building No. 3 in Equitable Life's Gateway Center at Pittsburgh's historic Point. Starratt Bros. and Eken, Inc., of New York, is general contractor.



As the billion-dollar floods of July receded from Kansas City, Mo., they left 10 inches of mud. Here a loader on an Allis-Chalmers tractor scoops some of it from in front of a trucking platform and loads it to a dump truck.

Marshlands Reclaimed For Agricultural Use

Soil-Conservation Tract Is Cleared, Drained, and Graded Providing Pasture and Crop Area in Notable Experiment

• OVER 150 years ago, Thomas Robert Malthus helped to term economics the "dismal science" with his essay on *The Principle of Population*. The English clergyman and political economist, pessimistic about the possibility for future progress of mankind, advanced the principle that "population always increases up to the limits of the means of subsistence". Malthus envisioned large segments of the world population starving and undernourished because of the limited arable lands and insufficient production of food.

What Malthus failed to foresee was the recourse to poorer soils through advanced methods of fertilization, and the increased areas from which raw materials and foodstuffs could be obtained. Colonization and developments in transportation during the 19th century opened up parts of the world that eventually became the breadbasket for millions.

Malthus, however, was more of a realist than his contemporary critics realized. Statistics show that in the last 135 years the population of the earth has doubled to reach the two billion mark. This figure is expected to double again by 2020—less than 70 years away—because of present high birth and low death rates through scientific progress in medicine and nutrition. Nevertheless, more than three-quarters of the world's population is said to be either starving or badly undernourished, and the basic reason for this condition is that less than four billion acres of crop land are available to these two billion people. Obviously more crop land must be developed, and at once, in order to catch up with this rapid increase in population.

In the light of this brief analysis, an experiment in land utilization and water control on a 180-acre tract in coastal Georgia is significant. From Fleming, Ga., a tiny whistle stop on the Atlantic Coast Line railroad in Liberty County, about 30 miles south of Savannah, may come the word that will result in a new agricultural economy for 6,000,000 acres of lowlands along the Atlantic coastal plain from Virginia to Florida.

Soil-Conservation Service

Known as the Southeastern Tidewater Soil Conservation Experiment Station, the Fleming project is operated cooperatively by the Soil Conservation Service of the Federal Department of Agriculture and the Georgia Coastal Plain Experiment Station, a state unit. Charles B. Gay, Project Supervisor of the Soil Conservation Service, heads the Fleming experiment. Gay is 39, a soil scientist, and a graduate of the University of Georgia.

The station got its start in the summer of 1949 when residents of soil-conservation districts became interested in reclaiming part of this coastal plain for crop lands. Local landowners acquired a 180-acre tract, and deeded it to the Soil Conservation Service for the noteworthy experiment in land utilization. The plot is nearly square, and fronts on U. S. 17, the Coastal Highway, east of Fleming. Another parcel, 500 acres in area, is also being acquired for further development of the experiment.

According to Project Supervisor Gay, the coastal plain contains two different soil types of high agricultural value. One is the Bladen and associated soils more familiarly known as "gumbo"

which are located in a belt 10 to 20 miles wide paralleling the coast from Virginia to Florida, and from 10 to 15 miles inland. The initial 180-acre tract is situated within this belt. The topsoil

is a thin layer of sandy loam, 3 to 12 inches thick, overlying the slowly permeable gumbo subsoil. Before the War Between the States, long staple sea-island cotton and indigo plants were grown intensively on these heavy up-land soils.

The other soil type is the extremely fertile fresh-water tidal marshes which served so well as rice fields in the early agricultural history of this country. Both soils are suitable for the growth of pasture grasses and truck crops.

Both soils also require water management of a kind unfamiliar in other parts of the United States. With an annual rainfall ranging from 40 to 80 inches over a flat and not very permeable subsoil, drainage and water control are of prime importance.

Ante-Bellum Days

During the ante-bellum period this historic section was intensively farmed. Following the War, and the collapse

(Continued on page 89)

Asphalt paving with low-cost local aggregate

Approaches to new Nueces Bay Causeway near Corpus Christi, Texas, were paved with hot mix Texaco Asphalt construction, using dredged sand-shell as aggregate in the mix. Heldenfels Brothers of Corpus Christi were the contractors.



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4 inches on others. Sand-shell also was employed as the foundation under the asphalt wearing surface.

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"Two-Bit Cops" in Construction?

In a recent issue of a well known national magazine, a famous dam builder, speaking of field engineers and inspectors, was quoted as saying, "They're not engineers; they're a bunch of two-bit cops enforcing stupid regulations they don't even try to understand."

The statement, unique largely because of its colorful conciseness, is not this superintendent's idea alone. In many and varying forms, our mudshoe editors have heard the same thought expressed privately by other superintendents. Fine. As we see it, perhaps there's more good than harm in such a healthy expression of opinion.

For if such "two-bit cop" conditions do exist, they serve to point out construction ills which have not all been corrected. If regulations seem stupid and not understandable, a lack of liaison between the top brass and the field is indicated. If there are two-bit cops in the field, who do not make any effort to understand regulations, it is an indication that civil-service requirements and salaries are not producing men with background, breadth of vision, or anything more on the ball than a search for "security" . . . whatever that is.

It often seems to us that there are far too many engineers and inspectors on most of the big projects. For example, we counted 8 inspectors on a 20-yard concrete pour on the Frenchman Cambridge Project in Nebraska, and 6 on a simple little channel pour in the state of Washington. It may well be that the ever-increasing complexities of modern construction projects call for more men like engineers, tech-

nicians, and inspectors. But that is never an excuse for staffing a project with more personnel than necessary, or for retaining them after their services are no longer needed.

It seems to us, as we consider the problem, that here is the fundamental cause of the trouble. Idleness on a construction job is dynamite. No reasonable person would disagree that the assignment of excess talent to a simple job is conducive to laziness, loss of efficiency and initiative, shirking of responsibility. And these are the very attributes usually associated with the "two-bit cop" epithet.

The Bureau of Reclamation, working in close liaison with the Associated General Contractors and its own field personnel, has done much to eliminate these ills. The Yuma office of the USBR a few years ago was known far and wide for its uncompromising attitude; a few days ago a contractor's superintendent said the same engineers were "wonderful to work with". That shows what can be accomplished with no loss in quality of work at the same time. The Bureau's job is not yet over, but it has set a pace for other agencies to follow.

Unless civil-service regulations permit supervisors to weed deadwood out of the government structure, unless designers climb down from their stools to meet with contractors and field people and explain what they are trying to accomplish, and unless contractors themselves realize that slipshod work with public money is a thing of the past, we are afraid the "two-bit cops" will be with us for some time to come.

Missouri Maintenance

There is always a danger in comparing the several state highway departments, or in singling out a particular one for praise or criticism, because not often can all the factors be completely gathered or accurately evaluated. For that reason, we have usually declined to make such comparisons.

But the more we ride over the nation's highway system and see 48 different types of maintenance, the more it seems to us that Missouri's Bureau of Maintenance delivers dollar-value performance second to none. At a time when the state is still struggling with the lowest motor-fuel tax in the nation, when Missouri's people all too often show unusual lack of sympathy with the problems of the State Highway Commission, some of the oldest pavements west of the Mississippi River are being maintained successfully

winter and summer.

It is a perfect example of good balance between the immoderate extremes of high-cost maintenance in some states, and lazy neglect in others. In Missouri, funds are limited. Highway mileage is high. Traffic is intermediate to heavy. In some cities the press is none too favorable. Many of the people show lack of appreciation for the Department because they have no opportunity to make comparisons with other states.

Through it all, the Bureau of Maintenance steers an intelligent middle course. Its three objectives remain (1) a smooth and safe roadway, (2) a clear waterway, and (3) a clean right-of-way.

Missouri's maintenance men are currently engaged in a mutual training-benefit program (see page 27), trying

to improve techniques, lower costs still further, and build valuable public support. Every man is wholeheartedly behind that program. We have heard their individual expressions of confidence that the Missouri highway system shall not go to pieces. We have seen motor-grader operators pitch to with a shovel and dress up a culvert inlet. We have seen no prima donnas in the whole department. Measured by any standard, that makes for an outstanding organization.

CONTRACTORS AND ENGINEERS MONTHLY extends its heartiest congratulations to Chief Engineer Carl W. Brown, to Engineer of Maintenance Rex M. Whitton, and especially to each and every man of what we believe is one of the best highway maintenance outfits in the nation.

Editors' Note: Since this editorial was written, Rex Whitton has succeeded Carl W. Brown as Chief Engineer of the Missouri State Highway Department. See page 27 of this issue.

Credit Where It's Due

To the Editors,

CONTRACTORS AND ENGINEERS MONTHLY:

With regard to your recent article on prestressed concrete [C&EMonthly, August, 1951, page 3] I would like to make one suggestion. It seems that Hoyer is given credit for a prestressing method which he did not develop. The inventor of the so-called Hoyer method was a Czechoslovakian engineer, Karl Wettstein, who obtained a patent for using thin wires in prestressed concrete on January 27, 1921. This was ten years before Hoyer obtained a similar patent in Germany. I do not wish to be a party to a controversy in this case, but the above dates are correct and credit should be given to the originator of the method.

Sincerely yours,
K. P. Billner, President
Vacuum Concrete Inc.
Philadelphia, Pa.

Editors' Note: Mr. Billner is quite right. A more detailed treatment of the subject appears in a discussion of Paper No. 46-53, "Patents and Codes Relating to Prestressed Concrete", published by the American Concrete Institute. In our article on prestressed concrete and its uses, we discussed methods of prestressing and did not attempt to cover the matter of inventors. Since the method is generally known as the Hoyer method (however mistakenly), we went along with that terminology.

What About Leonhardt?

To the Editors,

CONTRACTORS AND ENGINEERS MONTHLY:

It is evident that a great deal of research and work went into the preparation of your article on prestressed concrete [C&EMonthly, August, 1951, page 3]. However, it does not mention the Leonhardt method, developed by Dr. Fritz Leonhardt, a well known German bridge designer.

In the last two years more major bridges have been built using the Leonhardt method than any other. In 1949 six bridges were built under this system, and by September, 1950, seventeen more were completed. Bridges being constructed or now under design bring the total to forty.

Dr. Leonhardt has under construction the largest prestressed-concrete continuous-girder structure in the world. This bridge has a center span of 320 feet and two end spans each 59 feet long. Depth of the girders at the piers is 13 feet one inch, and at the midspan 5 feet 5 inches. The structure crosses the Neckarkanal at Heilbron, Germany. The Leonhardt system was also used for a 4-span continuous-girder railroad bridge over the Enz River, near Enzweihenden, Germany.

The Leonhardt method is a post-

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tensioning operation which is performed in the field and may be used for beam, girder, or slab construction. Principal feature of the method is the use of two semicylindrical precast-concrete blocks set at each end of the member. One block is anchored in position, the other is movable. The wires, or cables, are arranged in continuous coils around each pair of prestressing blocks. The wires are enclosed in a sheath or duct to prevent bond.

The uniqueness of the method lies in the design of the movable block. A hydraulic pressure cylinder, made of pressed-steel plates, is cast into the block. A piston fitted for the cylinder is cast onto the girder when the concrete is poured. After the concrete has hardened, hydraulic pressure is applied to the piston-cylinder arrangement through feed lines. The pressure induced forces the movable block away from the girder, thereby prestressing the wires. The block is held in this position while the gap between it and the girder is filled with a high-strength mortar. The ducts for the wires and the pressure cylinder are grouted at a later date.

Very truly yours,
Curzon Dobell,
General Manager,
The Preload Corp.
New York, N. Y.

Editors' Note: We are interested to learn of Dr. Leonhardt's work and regret that space did not permit full discussion of all methods of prestressing.

Prestressed Concrete Reprints Are Available

A 12-page reprint of the article "Prestressed Concrete: Its Future in the U. S.", which appeared in the August issue of CONTRACTORS AND ENGINEERS MONTHLY, is available on request. Just write to this magazine, 470 Fourth Ave., New York 16, N. Y.

A selected bibliography on prestressed concrete has been included in the reprint.

Scholarships in Humanities Are Established for Engineers

Harry A. Kuljian, Philadelphia engineer, has established two scholarships for seniors at the Massachusetts Institute of Technology. They are intended to help promising engineering students round out their education in world affairs, traditions, economics, and the humanities, in order that they may have a better understanding of human relations. Candidates for the \$500 scholarships will be nominated by Dean Burckhard, head of the new School of Humanities and Social Studies at M.I.T.

Hard-Rock Men Shape Highway Relocation

Fisher Contracting Co. Blasts Mountain, Drives New Tunnel In Arizona's Scenic Queen Creek Gorge

• IN Queen Creek Gorge, just east of Superior, Ariz., hard-rock tunnel stiffs and road-building experts are swiftly shaping one of the last major improvement links on U. S. 60. For years the Arizona Highway Department has spent millions to drop the highway lower down, away from the bad snow belt, and to eliminate the dangerous, obsolete curves. Present work brings the highway through towering dacite mountains, and through a sweeping curve into a new 1,200-foot tunnel.

Fisher Contracting Co. of Phoenix is doing the work under two Arizona Highway Department contracts. The first contract, on the Superior end, calls for 1,200 feet of tunnel and 0.3 mile of grading, through heavy rock, to establish a 40-foot roadbed. Contract price on this job, which is known by its Federal-Aid designation of F16 (11) AFE 7086, was \$580,000. The second contract, which Fisher landed while the organization was at work on the tunnel, includes 0.5 mile of grading through heavy rock at a cost of \$285,000. The finished roadbed is the same in the second job.

Excavation quantities give some idea of the terrain. In the first job are 154,200 cubic yards of rock grading and 41,418 cubic yards of tunnel excavation. In the ½-mile second project there are some 158,000 cubic yards of roadway excavation and 8,800 cubic yards for drainage and channel work.

Fisher's men lay no claim to making one of the deepest highway cuts ever attempted, but for the record, one of the solid-rock cuts on the upper job was 245 feet deep! Most of this heavy excavation lay alongside the present highway, and traffic had to be taken care of somehow. It was virtually impossible to work the excavation from the top, so special methods and machines for drilling holes into the side walls had to be developed. High scaling, with men working on ropes hundreds of feet in the air, had to be done. This job had not a single dull moment.

Drive Tunnel First

The old alignment of U. S. 60 brought the highway through the short 100-foot Claypool Tunnel, which sits out on the edge of nothing on the gorge rim. The new alignment brings the highway through a new 1,200-foot bore 25 feet high, horseshoe-shaped, 44 feet wide at the bottom. Arizona engineers had given some consideration to the idea of drilling the tunnel on a 6-degree curve, but the element of danger was so strong that the alignment was changed, and the tunnel is on a tangent.

Fisher's organization began work in February, 1950, and after a face-off period, the tunnel was under way on July 5. Ray Spangler, a tunnel expert from away back, came over from Fisher's job on the Wellton Canal near Yuma, and took over as Project Superintendent.

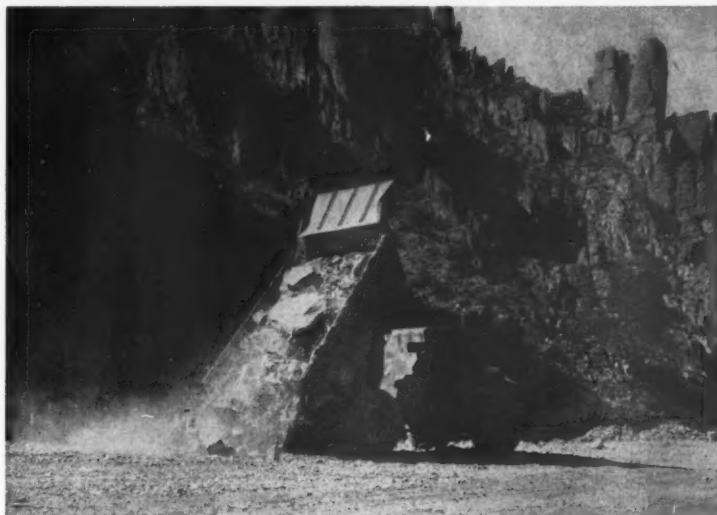
The geology of the site indicated a solid formation of dacite rock, but the Queen Creek Gorge is so spotty that geologists and engineers made no firm predictions. They did believe, at first, that the new tunnel could be drilled and opened to traffic without lining. Before Spangler had gone 500 feet he knew otherwise.

For the formation changed swiftly. In one place the rock was hard, and the miners were able to bring out 16-foot rounds without difficulty. Then

the rock became soft and treacherous, and the length of rounds dropped to as little as 6 feet. Spangler's crews got halfway in from the low west portal and hit a bad fault, which began to cave badly. It was impossible to keep on working that heading, so they moved over to the east portal and began drilling from that end. The tunnel was holed through in the fault zone.

Spangler set the tunnel face up with from 75 to 95 holes, depending on the type of rock. He made a V-cut in the

(Continued on next page)



C. & E. M. Photo

In Superior-Globe Canyon, a Euclid dumps its rock load at the edge of a high fill. The job was all rock, so no compaction requirements were put in the spec.

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Hard-Rock Men Shape Highway Relocation

(Continued from preceding page)

center of his heading, and drilled the other holes—arch, rib, and lifters—to break to the center cut.

Air was supplied by three Gardner-Denver 500-cfm compressors. Mounted on a rubber-tired flat-bed jumbo were ten Worthington 3½-inch water-lined drills, which pushed the steel and Liddicoat throwaway bits into the rock face. The largest diameter was 1⅞ inches. Holes were loaded with Apache gelatin and fitted with delay caps, No. 1 to No. 10.

Broken rock from the tunnel face was loaded by a stub-boom Lorain ¾-yard shovel, which fed the material to three 6-yard Koehring Dumpsters. The tunnel excavation was used in the roadway fill outside the bore, so the Dumpsters had only a short distance to go before they reached a disposal area.

In spite of the bad fault in the center, the tunnel was successfully holed through without using timber bracing. For weeks after the holing-through, however, the fault continued to cave in. Spangler's progress sheet for the 1,200-foot tube shows an average footage per 16-hour shift of 12.3. Each 16-hour shift was broken down generally on the basis of 8 hours drilling and loading, and 8 hours mucking out and preparing for the next round.

Spectacular Excavation

One of the most spectacular features was ordinary roadway excavation. The cuts were so deep, the terrain so rough, and problems so dismaying that every man on the payroll will remember his part of the work for years to come.

While the tunnel was being drilled, traffic was no problem. It continued to flow over the old highway, and everybody was happy. But when roadway excavation started, with thousands of tons of rock tumbling down on the highway from blasting, firm traffic-control measures had to be established.

Wide publicity was given to daily traffic schedules, and the road was barricaded to all traffic during work periods. Traffic was allowed to pass through the project on the following schedule: 2:00 a. m. to 2:30 a. m.; 6:30 to 7:30; 9:30 to 10:30; 12:30 p. m. to 1:30 p. m.; 3:30 to 4:30; 6:30 to 8:00; 10:00 to 11:00.

Naturally, this created a situation for the crews which had them under constant pressure. Their working schedules had to be planned around the ever-present condition of traffic at a definite hour. As a rule, motorists took the delay goodnaturedly, so Fisher's men and the highway department engineers could not take a chance of closing the road beyond the specified time limits.

Most of the rock excavation was involved in three deep and monstrous cuts. Jagged pinnacles reached far up the mountain sides. It was impossible to drill from the top with anything but jackhammers, and the yardage was too great to attempt to remove with hand-held drills. Larger holes were a necessity if the project was to make progress at all. Remember, during the traffic hours, all work had



C. & E. M. Photo

A wagon drill on the White truck sinks a hole in the dacite rock wall.

to stop and crews were paid for standing by until work time resumed.

Two special rigs were assembled, therefore, so the high walls could be

drilled from a straight-in position. A Maxi-mounted Link-Belt Speeder truck crane was brought in, and at the top of its 70-foot boom, a platform was

fastened to hold a Joy T-400 drill. Cables were arranged so the machine operator could keep the platform level, regardless of the boom angle. The air hose from a Gardner-Denver 500-cfm compressor, which fed this machine, was rigged up through the crane boom.

By using this rig with its boom practically vertical, the drills could sink holes 70 feet high on the gorge walls. In fact, they could reach a bit higher, by angling the topmost row of holes. With the crane boom at a lesser angle, holes could be drilled farther down.

The second special rig consisted of a White-truck-mounted drilling jumbo, with a 2-level drilling platform and a 500-cfm Gardner-Denver compressor. This rig also carried two Joy T-400 drills. It was used for sinking the two lower rows of lifter holes in any given shot.

The deep 245-foot cut posed an interesting problem. How could the men get it down? The crane boom would reach only 70 feet, and they didn't dare

(Continued on next page)

Performance Records Prove...

...that trucks equipped with Eaton 2-Speed Axles make faster trips, travel more miles, at lower cost per mile. They reduce strain and wear on engine and power transmitting parts, permit the engine to run at peak efficiency under all operating conditions. Records also prove that Eaton's exclusive features, including forced flow lubrication and planetary gearing, add thousands of miles to axle life, and assure top performance for

the life of the vehicle. Ask your dealer to explain how Eaton 2-Speed Axles pay for themselves many times over.

EATON

2-Speed Truck

AXLES



Axle Division
EATON MANUFACTURING COMPANY
CLEVELAND, OHIO



PRODUCTS: SODIUM COOLED, POPPET, AND FREE VALVES • TAPPETS • HYDRAULIC VALVE LIFTERS • VALVE SEAT INSERTS • JET ENGINE PARTS • ROTOR PUMPS • MOTOR TRUCK AXLES • PERMANENT MOLD GRAY IRON CASTINGS • HEATER-DEFROSTER UNITS • SNAP RINGS • SPRINGTITES • SPRING WASHERS • COLD DRAWN STEEL • STAMPINGS • LEAF AND COIL SPRINGS • DYNAMATIC DRIVES, BRAKES, DYNAMOMETERS



EXPERT REPAIRS
All Makes

USED INSTRUMENTS
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1325 CHERRY ST., PHILADELPHIA, PA.
GURLEY DISTRIBUTORS

drill. machine level, the air 0-cfm machine, boom, prac- sink walls, higher, holes, angle, wn. d of a umbo, and a essor. T-400 e two given

undercut the material. Powder Superintendent Bill West, a grizzled old veteran of many a tough rock job, figured he knew the answer. He sent men up to the very pinnacle with jackhammers, and laboriously pulled an air hose from a 500-cfm Gardner-Denver compressor. Using 24-foot steel, the jackhammer operators sank a row of holes along the slope line. They then worked part way down the slope from there, angling in drill holes to weaken the formation along the slope line.

A few shallow cuts were then made from below to shape the towering cut. When the base excavation reached a point where West figured the next one would bring down the whole mountain, he loaded those top holes and the ones he'd drilled along the slope line. Then he drilled a 20-foot round down below, and loaded it to the gills. When that shot was fired, 245 feet of mountainside crumbled away. The pinnacle came tumbling down. The highway was covered with rock, some of it big. That was one time when traffic schedules were not exactly maintained.

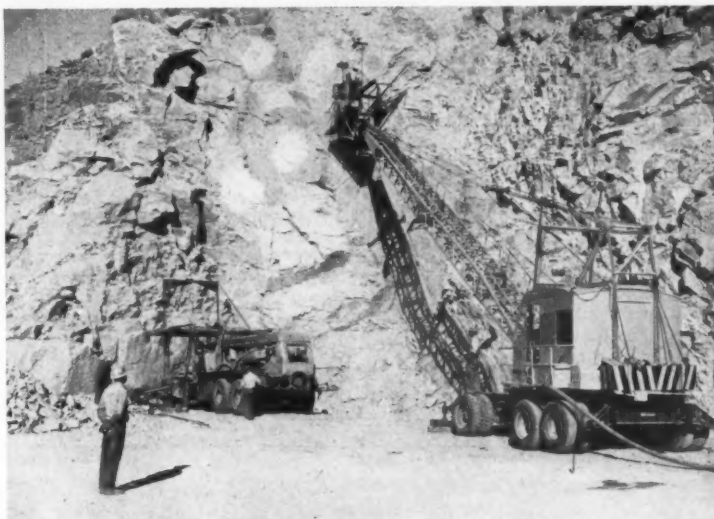
As a general rule, West drilled two rows of lifters along bottom grade, and other rows of holes in the face as far as the 70-foot boom would reach. The holes were spaced on 12-foot square centers. He tried to drill at least 20 feet deep. Both Timken and Ingersoll-Rand tungsten-carbide drill bits, 3 inches in diameter, were used, and West reports some excellent performance. Several bits have drilled 4,000 linear feet through the rock without resharpening, and the drillers often sank a 20-foot hole in 10 minutes. His average was a foot of drilling per minute. Only one bit broke. It failed on the threaded end.

Such performance was possible largely because of one "break" the drillers didn't expect. Remembering the manganese seams only a few miles down the canyon which caused Vinnel Co. so much grief, there was every reason to expect rock harder than the hubs of hell. Strangely enough, the rock at the upper end was somewhat soft and rotten.

West tried to drill enough holes to take care of from 23 to 28 boxes of powder. Hercules Gelamite C, in 2½-inch cartridges, was loaded and tamped into the holes. The upper row was fitted with zero delays and cross-connected with that wire leading to one battery terminal. Each succeeding row farther down used the next-size-greater delay, and each of these rows was connected to a trunk line which went to the other battery terminal. Lifter holes at the very bottom were the last to fire. Throughout the project, drilling and shooting by the horizontal method has been unusually efficient. The average powder ratio has been ½ pound per cubic yard of broken rock.

Shovel Loads Rock

When the shots were made, usually at night during low traffic hours, a Caterpillar D8-mounted U-type dozer moved in to clean up the mess and make a road through for traffic. Fortunately,



C. & E. M. Photo

Here's a typical section of the high rock wall in Superior-Globe Canyon. Side by side are the crane-mounted drills and the special White truck with lifter drills.

there was a 200-foot gorge along the worst cuts, so the dozer could work from the old highway and push the big rocks over the side. Seldom was there any traffic delay by the time the scheduled hour arrived.

Main loading of broken rock was the job of a Northwest 80-D shovel, which used a 2½-yard dipper to load three Euclid end-dumps. There was no setup for compaction, since the material consisted entirely of broken rock. The "Eucls" dumped near the edge of fills nearby, and the Caterpillar dozer spread the material and gradually built up the fills.

When CONTRACTORS AND ENGINEERS MONTHLY called on Superintendent Spangler early in May, the tunnel had been holed through and the upper job was almost complete. Work was nearly 2 months ahead of schedule, and Spangler figured he'd have a road open to traffic at all hours by June 15.

Production of granular subbase, and the bituminous paving work which will

(Concluded on next page)




40%

More Lift for Loading

...far better

DOZING



the NEW

OLIVER

INDUSTRIAL

OC-3



Here's the greatest little crawler tractor you've ever seen . . . the new Oliver Industrial "OC-3". It's ideally balanced for most effective loading and dozing . . . engine is mounted back so that front of tracks and radiator are practically in line. This better balance gives you 40% more lift with a front end loader . . . does a superior job of dozing and grading because blade is mounted close to the tracks for easier handling . . . precise control! And, operators find this bal-

anced tractor far easier to handle . . . far less fatiguing.

The new Oliver Industrial "OC-3" gives you a full 22 drawbar horsepower . . . plenty of power for jobs in its size. It's ruggedly built for the tough jobs . . . keeps maintenance costs down. Complete accessibility makes servicing easy.

For the complete story on the new Oliver Industrial "OC-3" and how it can help your operations, see your Oliver Industrial Distributor.

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Industrial Division: 19300 Euclid Avenue, Cleveland 17, Ohio

A complete line of industrial wheel and crawler tractors



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PIPE LOCATOR

"The Greatest Improvement in Years"

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Consider these Features:

- Matchless Performance
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- Shielded Leads
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- All these and many more at a NEW LOW PRICE

THE ONLY PIPE LOCATOR WITH THE LIFETIME GUARANTEE

For information write to Dept. 9L

THE *Detection* CO.

5627 CAHUENGA BLVD. NORTH HOLLYWOOD, CALIF.

Hard-Rock Men Shape Highway Relocation

(Continued from preceding page)

make a 24-foot pavement over the new location, was to be another contract, which was expected to get under way later in the summer of 1951 to tie the remaining links together.

A Long Fight

Construction of the more modern highway to 70-mile standards has been a long, tough fight. The old road wound like a snake through deep gorges, made innumerable switch-backs, and had steep grades. The maximum grade of 6.49 per cent on Fisher's job reflects the generally high design standards over the entire Superior-Miami route, a distance of 20 miles.

Construction links have been many. Work began about 1939 on the Globe end, and contractors forged link after link as funds became available. After the war, the spectacular Queen Creek and Pinto Creek bridges were also built by Fisher Contracting Co. The highway from the lower end of the new tunnel passes in a long, beautiful curve to the new Queen Creek Bridge.

The new alignment is expected to save untold thousands of dollars in snow-removal costs alone, because its grade is generally lower than that of the old route. It will certainly eliminate a bad traffic bottleneck, especially during the winter months, by dropping heavy trucks down out of the snow belt. Maintenance men look forward to easier lives after the road is open to traffic again.

Many men have taken part in the design and location of the highway. At the present time the work is under the general supervision of State Highway Engineer R. C. Perkins, with E. V. Miller as Assistant Deputy Engineer. A. F. "Gus" Rath is Resident Engineer in the field and C. B. Browning is Construction Engineer for the Arizona Highway Department.

A New Sand Spreader

A new sand spreader, designed specifically to prevent material from freezing in the hopper and clogging the throat, has been developed by John F. M. Lambert Mfg. Co., Salisbury, Mass. The Yankee spreader throws an even blanket of sand, salt, calcium, or similar material over a width of 16 feet. It is said to cover approximately 1,600 square yards per minute, traveling at a speed of 8 to 10 miles per hour. It is designed for trailer mounting behind a dump truck or other sand carrier.

The spreading disk is low-mounted to permit cars to pass without being sprayed while the machine is in operation. The spreader is friction-driven and has only two working parts, both of which run on roller bearings. The frame is of arc-welded angle-iron construction.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 602.

Hydraulic Equipment

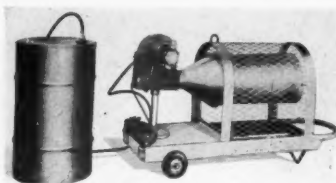
Two new catalogs detailing a complete line of hydraulic pumps, motors, and cylinders have been prepared by The Commercial Shearing & Stamping Co., 1775 Logan Ave., Youngstown 1, Ohio.

The first, Catalog H-4, illustrates and describes the new D Series oil-hydraulic pumps and motors for operating pressures up to 1,500 psi. The line includes both single and tandem pumps, and single motors. Six standard mountings are available and eight styles of shafts. Mounting data and dimensions are given for every size of every model. Complete porting arrangements are detailed for both side and end ports or

combinations of both. The company points out that there is a code identification for every component required to make any size or model of the D Series pumps and motors. By using the code, a customer can build the exact size and type of unit required and specify its model number.

The second booklet Catalog H-3, describes the complete standard line of double-acting, single-acting and telescopic oil-hydraulic cylinders of the heavy-duty type, suitable for operating pressures up to 1,500 psi. It covers types of mountings, styles of fittings, ratings, dimensions, and a few typical field applications.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 578.



The Eco-Temp oil-fired radiant heater produces 190,000 Btu per hour. It requires a regular 110-volt 60-cycle single-phase electrical connection.

New Portable Heater

A new portable oil-fired radiant heater, designed for temporary or permanent applications, has been developed by Arthur C. Baumann, Dept. J,

7011 Grays Ave., Philadelphia 42, Pa. The Eco-Temp burns No. 2 fuel oil on a high-combustion basis. It is designed to produce 190,000 Btu per hour, and fuel consumption is said to be 1.35 gph. The heater requires only a regular 110-volt 60-cycle single-phase electrical connection. The company recommends its use for drying, thawing, preheating, spot heating, and space heating.

The 175-pound machine is mounted on small rubber-tired wheels and can be moved about like a wheelbarrow. The fuel supply may be conveniently located nearby, and the fuel-oil line may be connected directly between the drum and the heater.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 601.

FIELD

FIELD SERVICE To get your job going sooner, most Thew-Lorain Distributors operate fleets of Service Trucks, fitted with tools for on-the-job maintenance, and manned by Factory-Trained technicians who know how to spot trouble and fix it in a jiffy.

SHOP

SHOP SERVICE In the shops of Thew-Lorain Distributors — with their special tools and equipment, operated by Factory-Trained Mechanics — you can obtain the more complete service and overhaul that will add years of life to hard-to-get machines.



MEN AT WORK — LEARNING...

Here's one group of the 265 Distributor men who have "graduated" from the factory service training program. These men learn on actual equipment, follow factory-recommended procedures for fastest maintenance best results.

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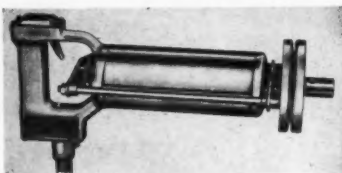
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SHO

New Hammer Drill For High-Speed Work

Another electromagnetic hammer drill has been added to the line of electric hammers and hammer drills manufactured by the Syntron Co., 227 Lexington Ave., Homer City, Pa. Model 17-RO is designed for high-speed work in concrete, brick, and stone, where quantity hole drilling is required, as in hanging heavy pipes and ducts, or installing machinery.

It has a 1½-inch drilling capacity, weighs 21½ pounds, and is available for operation from 110 or 220 volts. Automatic rotation of the carbide-tipped spiral-fluted drill is designed to speed up hole drilling, eliminate manual turning of the drill chuck, and reduce



Syntron's new electromagnetic hammer drill, Model 17-RO, is designed for high-speed quantity drilling.

fatigue. This automatic rotation is accomplished by a rubber ratchet mechanism actuated by the recoil of each of the hammer's 3,600 piston blows per minute.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 621.

Road-Patch Material Laid in Any Weather

This fall, Koppers Co., Inc., Pittsburgh 19, Pa., will start producing in limited quantities a new road-repair material called Komac. The advantages cited for it are these: It is mixed cold in any type of mixing equipment. It can be stockpiled during the summer and fall and removed easily from the pile in any kind of weather including coldest winter days. It does not adhere to hauling or spreading equipment. It needs only to be tamped or rolled into holes in pavement; no primer is required. It can carry traffic right after it is rolled. It does not bleed in hot weather. It makes a long-lasting patch—one that in many cases will outlive

the material surrounding it.

Komac is made by mixing special bituminous binders with aggregate to form a premix. For the time being Koppers will recommend it particularly for road patching; however, the company looks for its eventual use as a road surfacing.

Further information may be secured from the company or by using the Request Card at page 16. Circle No. 632.

New Heavy-Duty Lube

A new series of heavy-duty engine oils has been developed by The Texas Co., 135 E. 42nd St., New York 17, N. Y. The oils are designed specifically to lubricate heavy-duty gasoline engines and automotive-type diesel engines operated under adverse conditions. The company points out that engine design changes the use of many types of fuels, and the high sulfur content of diesel fuels tends to increase the severity of lubricant requirements for certain types of engines. The new series, Ursa Oil X Sup. One overcomes these conditions, the company says, and decreases engine deposits—thereby reducing wear on moving parts.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 579.

Lorain owners can get **FACTORY TRAINED** service from their nearby **LORAIN** Distributor

KEEP 'EM DIGGING-

... that's the important thing today! And the Thew-Lorain distributor organization offers you a two-edged approach to the vital job of keeping your present machines in operation.

265 SERVICE TECHNICIANS have graduated from the Thew-Lorain Factory Training Course and are well qualified to give you the full benefit of their experience and "know-how". As many as 95% of Thew-Lorain owners can call one of these trained men to their job when needed—in a maximum of 4 hours by car, and in much less time than that in thickly populated areas.

ON-THE-SHELF-PARTS are stocked by most Thew-Lorain distributors to the extent that 97% of all Lorain owners are never more than 8 hours by car (2 hours by air) from a Distributor capable of supplying at least 70% of needed parts right off his shelves.

Combine these skilled and trained Lorain technicians, only a few hours away, with on-hand Lorain-Engineered Parts and you have an unbeatable combination... and one of the big important advantages that protect the investment of every Lorain owner and keep Lorains on the job for many years. If you want to "keep 'em digging" in the days and years ahead, your Thew-Lorain Distributor is the man to see!

THE THEW SHOVEL CO., LORAIN, OHIO



THEW LORAIN

SHOVELS • CRANE • DRAGLINE • HOES • CLAMSHELLS • MOTO-CRANES

For Power on-the-Job

Two new catalogs, one on heavy-duty diesel engines, the other on diesel electric sets, have been issued by Caterpillar Tractor Co., Peoria 8, Ill. The first of these covers 12 sizes of Caterpillar diesels with a rated power range of 47 to 450 hp. This booklet points out that Cat diesels are offered with a complete selection of attachments to make up packaged power units. It illustrates various standard packaged arrangements. Engine construction, operation, and applications are also described in detail.

The second booklet illustrates wide usage of Caterpillar diesel electric sets on various power applications. It outlines the specifications of the models which range from 21 to 314 kw. A special chart for self-regulated and externally regulated sets is also featured. Additional information covers the type of attachments available; construction, portability, performance features of the sets; and data.

This literature may be obtained from the company. Request Form No. 30180 for the diesel engines and Form No. 30178 for the diesel electric set. Or use the Request Card at page 16. Circle No. 682 and No. 683 respectively.

New Building for Dietrich

Dietrich Bros., Inc., steel fabricating concern, with branches at Washington, D. C. and Raleigh, N. C., moved on May 14 into its new office building at 2700 Loch Raven Road, Baltimore. This new building consolidates all the operations of the company; structural steel fabrication, reinforcing steel, ornamental fabrication, the stock yards, and the general office are now centrally located at the main building. The modern "T" shaped two-story building is completely fireproof with special air-conditioning designed to utilize the sun's heat.

Baltimore Contractors, Inc., was the general contractor for the project. The building is 150 feet on one dimension, 100 feet on the other, with a 50-foot depth; it has a large garage and blueprint room in the basement. Sixty per cent of the second floor is occupied by the drafting room and the balance of the structure is given over to offices for executives and employees. Solex glass, a heat-resistant variety, is used throughout. The drafting room is lighted for 100-foot candles—the equivalent of daylight—in all areas. All offices are treated with acoustical Celotex for noise reduction.

Air Force Base Gets Classroom Building

Two-Story Masonry Classroom Structure Is Key Building In Big Expansion Program at Keesler Field, Biloxi, Miss.

• THE U. S. Air Force is expanding its electronics and radiological defense-training center at Keesler Air Force Base, Biloxi, Miss. A part of this building program, estimated at around \$8,000,000, is under contract to the Ewin Engineering Corp. of Mobile, Ala., with the U. S. Corps of Engineers, Mobile District, supervising the construction. Current work got under way at the field last September, and is being rushed to completion to accommodate the increasing number of trainees assigned to this growing air force base on the Gulf Coast.

Most prominent in the multibuilding project is the box-like academic building, a 2-story masonry structure, 302 feet long x 228 feet wide, which contains over a hundred classrooms and offices. Started only last December, the big, windowless, air-conditioned building was completed in June. It was designed by J. B. Converse & Co., Inc., and Harry Inge Johnstone, Architect-Engineers of Mobile, Ala. Future contracts call for the construction of three similar academic buildings. Men are expected to be trained in these laboratory-classrooms on a 24-hour round-the-clock basis.

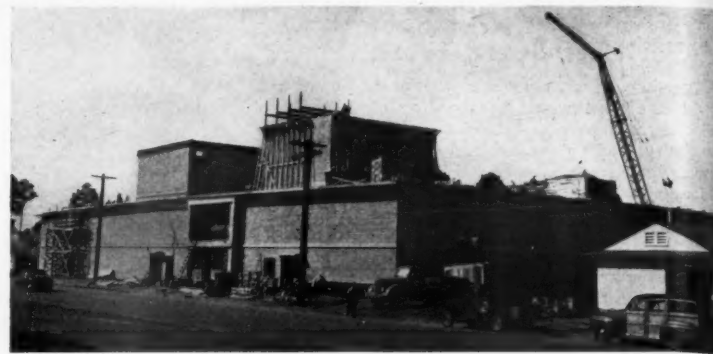
In addition to the sprawling classroom structure, the present Ewin work includes the erection of 23 barrack buildings—12 L-type and 11 I-type; a mess hall; 7 orderly buildings; 3 utility buildings; and the relocation of the motor pool. Barracks are of reinforced-concrete construction, while the other buildings are wood frame, with concrete floors and built-up roofing. The academic building was put up on the former site of the motor pool. The new motor-pool group includes an administration building, drivers' school, tire-repair shop, staff-car storage shed, and adjacent parking field.

Since its inception in 1941, Keesler Air Force Base has grown to include over 1,000 building units and an Air

Force personnel exceeding 20,000. Besides the Ewin Engineering Corp. contract, a \$10,000,000 housing project is also under way at the field to provide homes for the families of 580 officers and noncoms.

On Pile Foundation

The academic building is on a timber-pile foundation capped with reinforced-concrete footings supporting RC grade beams on which are built load-bearing walls of concrete masonry block. Ground floor, second floor, and roof are



C. & E. M. Photo

School bells are ringing at Keesler Air Force Base, Biloxi, Miss. This is the first of four laboratory-classroom buildings to go in there for trainees.

concrete slabs, the latter two being supported on steel bar joists stretched across the bearing walls. For the foundation, 1,231 creosoted-timber piles were driven in from 2-pile to 7-pile clusters. Southern Creosoting Co. of Mobile supplied most of the piles, 18

to 22 feet long with 8-inch tips; average length was 20 feet.

Most of the piles were driven to support the bearing walls, with others concentrated under the area of the six pent houses, above roof level, where

(Continued on next page)

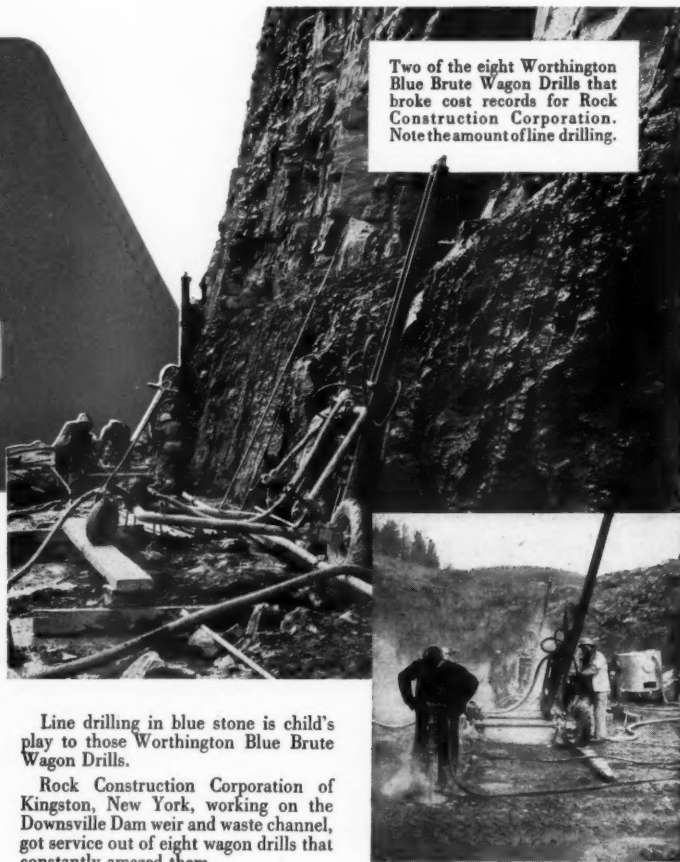
300,000 YARDS
maintenance
still too low
to be figured



President Walt Dunham and Engineer A. Bruce Lattanzi in the company's Downsville Dam office.



Two 500' Worthington Blue Brute Air Compressors supplying air for drills at the Downsville Dam.



Two of the eight Worthington Blue Brute Wagon Drills that broke cost records for Rock Construction Corporation. Note the amount of line drilling.

Line drilling in blue stone is child's play to those Worthington Blue Brute Wagon Drills.

Rock Construction Corporation of Kingston, New York, working on the Downsville Dam weir and waste channel, got service out of eight wagon drills that constantly amazed them.

Walt Dunham, president, reported: "We have drilled as much as 700-800 feet per 8-hour day per machine. In 165 working days, the machines put out 300,000 cu yds with so little maintenance it can't be figured in cost per yard."

This job also used a number of Worthington Blue Brute Hand-Held Rock Drills. Says Mr. Dunham: "There has been absolutely no maintenance cost. Our operators like them better than anything they have ever used."

Worthington Blue Brute Rock Drill operating ahead of the wagons collaring hole for laying out line drilling.

Contractors everywhere know that a Worthington Blue Brute team—air compressor and tools—makes mincemeat out of even the toughest jobs. See your nearby Worthington distributor for a demonstration. Worthington Pump and Machinery Corporation, Construction Equipment Division, Dunellen, N. J.

WORTHINGTON

BUY BLUE BRUTES



IF IT'S A CONSTRUCTION JOB, IT'S A BLUE BRUTE JOB

BOSTROM LEVELS For Half A Century



No. 5 BOSTROM Convertible Level (with Compass when desired)

Have been the most economical precision leveling instruments on the market.

Used and endorsed by contractors and builders everywhere. Sold on guarantee of satisfaction or money back.

Carried in stock by distributors from coast to coast.

Write today for literature, prices, and name of our distributor near you.



No. 4 BOSTROM Contractors' Level

Bostrom - Brady Mfg. Co.

538 Stonewall St., S.W. Atlanta, Ga.



C. & E. M. Photo

A Ewin workman uses a Ramset .22 to nail stripping to steel bar joists. Fiberglass tile will be hung from the stripping to sound-condition classroom ceilings.

stored in a B-K 300-barrel cement bin. Water for the mix was piped from a main on the field up to a 150-gallon tank at the cement bin. From 15 to 20 truck mixers of various makes, mostly 3-yard capacity, delivered the 6-bag batches of 3,000-pound concrete to the structure being poured. Wherever possible, the concrete was chuted directly into the forms; on the higher pours, cranes and buckets were used. Below ground level the forms were built of wood lagging, and above that, of plywood $\frac{3}{4}$ inch thick. RC columns, either 12 x 12-inch or 12 x 24-inch, are located only in areas of concentrated loading such as the penthouse towers.

After the pile caps were poured, grade beams were constructed of reinforced concrete varying in width from 8 to 20 inches and with a depth of 2 feet. They span the caps, bridging between them, and are doweled at the center of the spans but left free at the ends for expansion. The ground floor has a 6-inch RC slab that is laid on a

(Continued on next page)



C. & E. M. Photo

A Bell Prime Mover containing mortar for the concrete-block walls of the academic building goes into a Jaeger lift—a one-drum hoist with a 40-foot tower.

the air-conditioning machinery is housed. Under the walls the piles are in clusters of two, on 3-foot centers, and project 6 inches into a typical 2-pile cap or footing measuring $5\frac{1}{2}$ x $2\frac{1}{2}$ x 2 feet deep. The concrete footings are reinforced both ways with hooked bars. Spacing of the pile clusters was determined after a study of the soil strata obtained by core drilling.

Three rigs—a Link-Belt, Lorain, and an American—drove the timber piles with Vulcan No. 1 hammers and swinging leads; boilers were set up for the first two drivers, while the American crane was a steam-driven machine. The average pile, driven into the sand strata, required from 26 to 50 blows per foot.

Transit-Mix Concrete

Coast Materials Co. of Gulfport, Miss., supplied transit-mix concrete for the project from a batch plant that was set up on Air Base property along a siding served by the Louisville & Nashville Railroad. The American Sand & Gravel Co. of Hattiesburg, Miss., furnished the aggregate; it was unloaded from cars at the siding by a Link-Belt Speeder crane equipped with a 45-foot boom and a PMCO $\frac{1}{2}$ -yard clamshell bucket, and stockpiled. Coarse aggregate was graded from 1-inch down. At the stockpiles a Universal crane with a 55-foot boom and a Blaw-Knox $\frac{3}{4}$ -yard clamshell bucket charged a Blaw-Knox 75-ton 2-compartment storage bin.

Bulk cement came from the Ideal Cement Co. in Mobile, Ala., and after being unloaded from railroad cars was

DIG HOLES SITTING DOWN



ONE-MAN OPERATION

The Danuser Digger is easily installed on most popular makes of tractors—augers from 4" to 24" available in eight sizes. Quality built—rugged construction throughout. Literature showing application to your particular tractor available, write

DANUSER MACHINE CO.
537-41 E. THIRD ST., FULTON, MO.

DANUSER DIGGER

Tested and approved by most tractor manufacturers.

"In building 417 housing units for naval personnel
DEWALT was the important part
in our semi-prefabrication program"



Part of the \$3,800,000 defense housing project at Annapolis, Md.

A \$3,800,000 project—the Severn River Homes Apartments recently completed at Annapolis, Md.—is another good example of the use of semi-prefabrication for today's defense housing.

For this type of building, DeWalt supplies the speed, the assembly cutting, the precision accuracy, so vitally needed.

This is what the mill superintendent of Arundel Land, Inc.—builders of the project—has to say about DeWalt on the job:

"We had 2 five h.p. DeWalts and 1 three h.p. DeWalt—two of them in constant use from the start of the job, the other kept running pretty regularly. We wouldn't use anything else. We had to cut about 200 *different* lengths of material (joists, studs, bridging—anything in the field) and we needed the precision and the versatile cutting of DeWalt. DeWalt is *solid*—no chance for anything but accurate cutting."

Investigate DeWalt! Learn what this all-purpose machine can do in the building of hotels, hospitals, defense housing—how it speeds up work in machine or carpenter shops located on the construction operation of bridges, dams, locks, factories.

DeWalt is available in models ranging from $\frac{1}{2}$ h.p. to $7\frac{1}{2}$ h.p. Send coupon for complete information.



NEW!

DE WALT GR
with low dead
rise motor!

DeWalt, Inc., Dept. CEM-9
Fountain Avenue
Lancaster, Pa.

Please send me complete information on DeWalt.

Name.....

Address.....

City..... State.....

DEWALT INC.

A subsidiary of American Machine & Foundry Co.

Air Force Base Gets Classroom Building

(Continued from preceding page)

gravel fill and is independent of the grade beams. Before the slab was laid the fill was topped with a mopped-on waterproof membrane.

The length of the building is divided into five sections by four expansion joints extending from the bottom to the top across the full width of the structure. These 1-inch joints have a V-shape copper diaphragm that permits each section to expand and contract. The building is 23 feet high above a finished first-floor elevation of 21.0. The second floor is 11 feet 8 inches above the first-floor grade, and the roof is 11 feet 4 inches above that. The roof slab has a 3-foot overhang at the sides to prevent rain from running down the outside of the building.

Concrete-Block Walls

Running lengthwise of the building are nine load-bearing walls supporting the steel bar joists. These masonry walls are built of lightweight concrete blocks furnished by the Radcliff Gravel Co. of Mobile, Ala. Delivery was made to the project by truck. Blocks are 8 x 8 x 16-inch and 4 x 8 x 16-inch, other sizes being cut to dimension with an Eveready Briksaw.

Exterior walls up to the second-floor level are 16 inches thick made up of two of the 8 x 8 blocks. From the second floor to the roof the exterior walls are 12 inches, consisting of an 8 x 8 and a 4 x 8 block. Most of the interior corridor walls are 12 inches, with the exception of a couple of through 16-inch walls. Masonry partition walls are 8 inches. Supported on the grade beams, the masonry walls were built from Waco scaffolding, with every other block secured with a 1/4 x 1 1/4 x 7-inch Z-type anchor.

A belt conveyor was used to carry blocks to the masons working above the second floor, while the mortar was delivered with five Bell Prime Movers. These power units either ran up a wooden ramp, built along one side of the building, to the second floor, or were raised to roof level by outside hoist and towers. At one end of the structure was a Jaeger lift with a one-drum hoist and a 40-foot tower, while at the other end was a 35-foot Scoop-mobile hoist and tower. The exterior walls are waterproofed for the full height with two coats of Seal-Rite paint, which are guaranteed against leakage and dampness for 5 years.

Steel Bar Joists

Cranes set 18-inch-deep steel bar joists for the second-floor framing and 16-inch joists for the roof support; average spacing of both sizes is 2 feet throughout. With their ends resting on the masonry bearing walls, the joists supported the Pittsburgh Steeltex floor lath on which 2 1/2-inch concrete slabs were poured for both the second floor and roof. The reinforcing consists of 4 x 4-inch welded-wire 6-gage galvanized mesh.

The proper depth of concrete was maintained in the slabs with pipe screeds, spaced 10 feet apart. Wooden pegs were driven through the slots at the tops of the joists, and the sections of 1-inch pipe screeds were wired to the pegs. The concrete was leveled off with straightedges to the tops of the pipe lengths, which were then removed. The surface of the floor slabs was given a steel-trowel finish.

Over the roof slab is an insulating course of Owens-Corning Fiberglas, topped by a 20-year-guaranteed 5-ply asphalt-gravel roofing, the asphalt and felt being furnished by the Ruberoid Co. The bitumen was heated in Aeroil heaters. Concrete was cured with water. Material and equipment were handled and lifted to the top of the



C. & E. M. Photo

On the roof of the building, workmen mop on Ruberoid asphalt over an insulating course of Owens-Corning Fiberglas.

building by a Koehring 65-foot-boom crane and a Link-Belt Speeder truck crane equipped with a 70-foot boom and a 20-foot jib.

Building Interior

Owens-Corning Fiberglas tile is used throughout for sound-conditioning ceilings in the buildings. The perforated mineral-tile squares are hung from stripping nailed to 2 x 4's fastened to the bottom of the steel bar joists. In the beginning the 2 x 4's were bolted to the joists, but this was a slow and costly operation that was soon discarded in favor of a Ramset .22 that drove 3-inch No. 12 nails through the lumber, bottom chord of joist, and a 3/8-inch steel plate on top of that. Men wearing transparent protective masks worked from scaffolds, driving the nails through the 2 x 4's on an average of 36-inch centers.

Classrooms are six abreast across the building, served by three corridors running the full length of the structure.

(Concluded on next page)



KEEP A

DRILLS of all types run better with Texaco Rock Drill Lubricant EP. One user states: "We are amazed at the performance of this oil in comparison with what we had been using. We have cut oil consumption 50% and have shown a remarkable reduction in maintenance on all our drills."

What's the best air compressor oil to keep your compressors working and your maintenance costs low? That depends on your operating conditions. But it *must* be an oil especially designed to meet those conditions. Texaco has it. For example—

★★ To assure clean operation and reduce wear under *normal conditions*, use a Texaco *straight mineral* air compressor oil.

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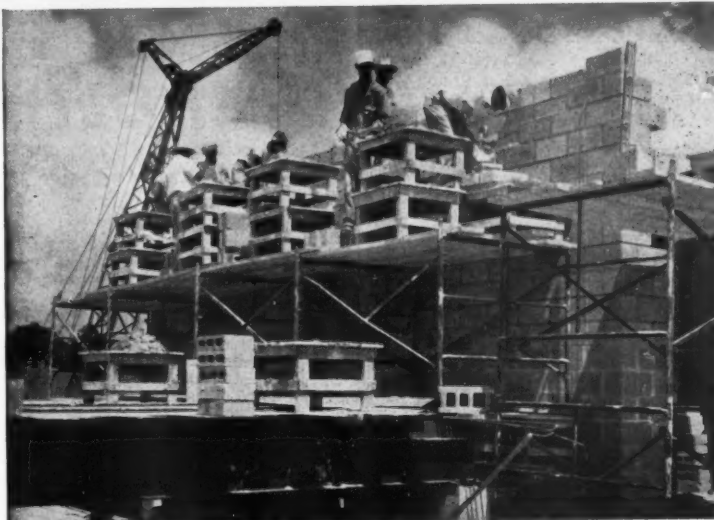
SEPTEMBER, 1951

A central corridor crosses the building in the middle. The length will accommodate 10 classrooms measuring 28 x 32 feet—or 60 rooms to a floor, 120 to the building. But with some of the rooms slightly larger in size, the total number of classrooms is a little over 100.

Interior non-load-bearing partitions between classrooms are built with a row of 2 x 4 studs on 16-inch centers, covered with ½-inch gypsum wall board. To resist the passage of sound between rooms, the space between the studs is filled with a 1½-inch blanket of fiber glass and asbestos.

Air-Conditioned Throughout

The academic building, devoid of windows, is air-conditioned throughout with four Trane Centrivic machines, each having a capacity of 200 tons. From equipment on the roof the conditioned air is fed through ducts in the corridors into the classrooms by means of Connor Kno-Draft adjustable air diffusers. The building is divided into twelve separate zones, with air re-



C. & E. M. Photo

Above roof level, concrete blocks are laid for the tower that will hold the air-conditioning equipment. Those are Waco scaffolds.

turns to penthouses on the roof. Two redwood towers located on the roof will cool condenser water. Steam heat in the winter will be supplied from a central plant at the base.

Kalamein doors are used at all outside openings and at the stairwells. They are fire-resistant with asbestos cores and laminated steel finish. Classrooms are equipped with blackboards and fluorescent lights, and are painted a light green. The outside of the building is painted off-white. During the construction, temporary light lines were strung throughout the interior to illuminate the labyrinth of rooms and corridors, and floor fans were set up to dry out the walls and floors and for the comfort of the workers. With the installation of the electronic and radiological equipment, the academic building was ready for use.

Quantities and Personnel

The major items of building materials in the two-story 302 x 228-foot structure were:

Treated-timber piles	1,231
Concrete	4,500 cu. yds.
Bar joists	300 tons
Concrete blocks	215,000

At the peak of construction the Ewin Engineering Corp. employed an average force of 1,400 on the big multibuilding project. V. L. Taylor is Project Manager, assisted by Charles W. Edwards, General Superintendent, and Superintendents W. J. Jones, Morris Tidwell, and G. A. Caramella.

Thomas C. Kemp is Resident Engineer for the U. S. Corps of Engineers. The Mobile District is headed by Col. W. K. Wilson, Jr., District Engineer.

Roadside War on Poison Ivy

Poison ivy is being systematically eliminated from the roadsides of Pennsylvania, according to the Pennsylvania Department of Highways. Dangerous alike to picnickers and maintenance crews, it has been the cause of a great many lost man-hours.

The Highway Department's program calls for spraying both young and old growths of poison ivy with a chemical, extreme care being exercised to prevent loss of valuable erosion-control plants. District highway foresters have been provided with more than 360 gallons of a herbicide consisting of a combination of 2,4-D and 2,4,5-T. Spraying is also done within highway right-of-ways on other noxious or undesirable weeds such as Canada thistle, horse nettle, wild mustard, ragweed, common mullein, wild chicory, and pokeweed.

Many sprayed areas have shown almost 100 per cent kill within a week, and spraying with herbicides has also been found profitable in areas back of guardrails, around bridges, culverts, etc., where mechanical control of weeds is either costly or impractical.

Power Wheelbarrows

A 4-page folder featuring the Moto-Bug power wheelbarrow is put out by Kwik-Mix Co., Port Washington, Wis. This versatile unit may be used with a 10-cubic-foot barrow, a 32-inch platform body, or a fork lift. Its forward and reverse speeds, controlled dump, and direct steering are designed to reduce cost in materials handling.

The folder lists specifications and dimensions, and pictures the underside of the unit. It points out that the Moto-Bug moves up 20-degree ramps with a full 1,200-pound load.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 684.

Thew Promotes Gunther

G. E. Gunther is now Assistant Sales Manager for The Thew Shovel Co., Lorain, Ohio. He used to be District Sales Manager for the central territory.

AIR COMPRESSORS

ON THE JOB—

regardless
of operating
conditions

...with **TEXACO**
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inter- and after-coolers, lines and receivers, use a Texaco *rust-inhibited* air compressor oil.

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A Texaco Lubrication Engineer will gladly help you select the one proper Texaco air compressor oil to assure you greater efficiency and lower costs under your particular operating conditions. And don't forget to ask him about the Texaco Simplified Lubrication Plan for *all* your equipment. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT



The ratchet-operating principle of the new Coffing Hoist-Binder permits tightening or slackening off any amount without releasing the load for a new "grab."

A Hoist-Type Binder

Safety, convenience, and simplicity of operation are features claimed for the new Hoist-Binder by Coffing Hoist Co., 800 Walter St., Danville, Ill. Since the binder works on the ratchet-hoist principle, it will take up or slack off a load chain any amount up to a full 20½ inches—or more if a longer chain is used in the binder. The binder weighs 10 pounds and is said to exert a pull of 3,000 pounds.

According to the manufacturer, this is important with "springy" loads, where the binding chain or cable must be tightened by force through considerable distance to secure the load fully. If a load settles in transit, the new Coffing unit may be tightened any amount without releasing the entire load to take a new "grab". Full strokes can be used for rapid take-up; half strokes permit small adjustments. To further speed of operation, the binder chain may be pulled freely through the ratchet when not under load.

Binding and slackening off may be done with the handle only. When the handle is out, the load cannot be released; the handle may be removed to prevent tampering with either the load or the binder. Another safety feature is that the handle bends before the binder can be overloaded beyond safe limits.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 672.

Air-Starting Motors

Two new air-starting motors for cranking gasoline and diesel engines with piston displacements up to 3,500 cubic inches have been announced by Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

The starters are available in two sizes. The 9 BM develops up to 16 hp and requires approximately 7 cubic feet of air per start. The 20 BM develops up to 41 hp and requires approximately 16 cubic feet of air per start. Although normally operated by compressed air, they are also suitable for operation on natural gas where available at sufficient pressure. The company points out that the starters eliminate generators and batteries, and the costs of battery maintenance and replacement. They are not affected by climatic conditions, and they are easy to install, I-R says.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 590.

White Appoints to Sterling

The White Motor Co., Cleveland, Ohio, announces two appointments to the Sterling Division: William G. Sternberg has been elected Vice President in charge of the division, with head-

quarters at Milwaukee; and Ernest R. Sternberg is named General Manager. W. G. Sternberg was formerly President of the Sterling Motor Truck Co., the firm recently acquired by White and now being operated as a division of the company.

Flooring Underlayments

A new 4-page folder on mastic flooring underlayments, including both asphalt and rubber types, has been issued by The Flintkote Co., Inc., 30 Rockefeller Plaza, New York 20, N. Y. Flooring underlayments are used to provide a level base, resistance to shock, effective sound deadening, and moisture resistance for installations of decorative floor coverings. The composition and mixtures for asphalt-emulsion and rubber-latex binders are described in the folder, as are the recommended practices for their application.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 687.

The "FITZ" CONCRETE HANDLING BUCKET

At last, a bucket designed to pour concrete against the side of a wall — side bottom opening. 1/3, 2/3 and 1-yard capacities — opening can be operated from either side of bucket. 3' overall height from ground level. Easily loaded from any truck mixer — Bucket always vertical regardless of load. Immediate Delivery — \$165.00 for 1/3 yard bucket delivered.

Dealers Wanted

FITZGERALD ENGINEERING CO.

233 South Dixie Highway

Coral Gables, Fla.

Also Mfrs. of the famous "Sewer Scooter."



PAYLOADERS

PAY OFF ANY PLACE



CATALOG and complete facts about any size PAYLOADER are available without obligation: the big 4-wheel drive 1½ yd. Model HM; the 1¼ yd. HY; the ¾ yd. HF; the ½ yd. HE; the 12 cu. ft. HA.

PAYLOADERS work where you want them to work — on pavement, in sand, gravel or stone pits, in yards, or on any earth-moving job off the road, because they have tremendous traction and flotation on big pneumatic tires, plus proper weight distribution.

ALL PAYLOADERS have full-reversing transmissions with several speeds both forward and reverse. ALL PAYLOADERS have operator location high and forward for full visibility... have complete fingertip hydraulic control of lifting, lowering, bucket-dump and bucket-close.

In PAYLOADERS you are assured of the best in tractor-shovels — complete unit-design tractors and shovels built by the world's largest tractor-shovel manufacturer, with a world-wide service organization to keep your jobs going. THE FRANK G. HOUGH CO., 762 Sunnyside Avenue, Libertyville, Illinois.



County Accelerates Road Construction

County Calls Consultants and Contractors to Rush Highway Construction as Traffic Demands Increase

• IN January, 1950, voters of Dallas County, Texas, approved by a 3 to 1 majority the passage of a \$22,500,000 bond issue. That money is now being used, without Federal Aid, to build one of the finest county highway systems this fast-growing metropolitan area has ever seen. Approximately \$5,335,000 worth of construction contracts are now in force.

Although Dallas County has an excellent engineering department under the guidance of Jack Davis, County Engineer, the County Commissioners' Court hesitated to throw the huge engineering job on the shoulders of a department already busy. So the Commissioners' Court did what many a city and county planning organization is doing. The design and engineering work connected with the majority of new work was farmed out to the consulting-engineer firm of Koch & Fowler of Dallas. As the contracts came up for construction, the work was advertised and let to the low bidder. Inspection and testing is under supervision of the consultants.

But Davis and his engineering organization are also quite busy in the new program. His department takes care of right-of-way acquisition, and several jobs, including seven bridges, are under his jurisdiction for one reason or another.

The roster of contractors engaged in the big county road program sounds like the guest register at a Texas Highway Department letting. Some of the firms are Texas Bitulithic Co., Uvalde Construction Co., Southwest General Construction Co., Austin Road Co., Worrell & Watkins, John T. Leslie, John F. Buckner, J. B. McHale, Austin Contracting Co., Russell Smith, Boyd Calen, and Cullum & Whittle.

Scope and Design

High on the priority list for construction is a road around the outer rim of Dallas County, with laterals and connections which tie in to the general traffic pattern. Over 100 miles of major highway construction are involved in this one item alone. In addition, the program contemplates immediate construction of two 4-lane major crossings of the Trinity River, and one 2-lane future crossing of the same stream. The bridges and new highways are being carefully tied in to prevailing traffic patterns to serve the most vehicles.

Minimum right-of-way width of 80 feet is being acquired, with up to 120 feet being purchased where future development of additional traffic makes it appear desirable. Davis' office is handling this acquisition, working in close cooperation with the consulting firm to dovetail the two branches of work.

While Koch & Fowler has designed portland-cement-concrete pavement in a few places where foundation soil

makes it desirable, most of the new work is bituminous. The typical section of new construction consists of a 40-foot roadbed, divided into 24 feet of riding surface and two 8-foot shoulders.

Minimum compaction to 90 per cent of modified AASHO density is required in the subgrade, which is also positively shaped with a 3-inch crown to insure absolute top drainage. A 6-inch course of compacted gravel or crushed-rock subbase is then applied full width, to continue the positive drainage feature. Four inches of bituminous-mixed sta-



C. & E. M. Photo

M. H. Burns, owner of M. H. Burns Construction Co., uses a Caterpillar No. 12 motor grader to shape and drain Lake June Road in Dallas County, Texas.

bilized select aggregate are then put on. This mix usually consists of MC-3, mixed through a pugmill, and select aggregates from 1½-inch minus. After this select course is laid and rolled by conventional methods, a high-type asphaltic-concrete riding surface 1½ to 2 inches thick is then applied.

Good Progress Made

Excellent progress is being made. The various contractors work closely with the consulting engineers, and when weather permits, they move grading and bituminous equipment to the jobs and push the construction as

(Concluded on next page)



FOSTER'S PILING RENTAL SERVICE

WHIPS WICKED SOIL CONDITIONS ON OWL'S HEAD SEWAGE JOB!

APPROXIMATELY 1600 WALL-FEET OF FOSTER RENTAL PILING—ON TIME!

This steel sheet piling (AP-8 Sections) was used in conjunction with the construction of a monolithic concrete sewer which runs along the seawall in the Bay Ridge area of Brooklyn, parallel to the Belt Parkway. It was used as a retaining wall while the concrete sewer was poured into place. This rental piling—delivered on time, with the usual prompt and dependable Foster service—prevented water from seeping into the sewer trench, and protected work and personnel against possible landslides.

The Subterranean Corporation, constructing the new \$20,000,000 Owl's Head Sewage Treatment Works Intercepting Sewers Project at South Branch, Brooklyn, encountered rougher than usual soil conditions. A disruptive seepage problem existed which made the use of steel sheet piling essential. In response to an emergency order from Mr. R. B. Murdock, President of The Subterranean Corporation, and an urgent request from Frederick H. Zurmuhlen, Commissioner of New York City Department of Public Works, the L. B. Foster Company rushed RENTAL STEEL SHEET PILING (AP-8 Sections) to the site of the troublesome leakage in time to prevent heavy losses from work interruption.

Foster's Piling Rental Service solves those "sudden emergencies"—gives you a "Head-Start" that means "Headway" by shipping immediately the exact lengths and exact sections of piling your job demands.

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PITTSBURGH 30, P.A. CHICAGO 4, ILL.
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NEW!—"HEX-LOCK"



The single-unit Clamp that permits easier tightening and loosening

Write for circular

WILLIAMS FORM ENGINEERING CORPORATION

1501 Madison Ave., S.E., Grand Rapids, Mich.

County Accelerates Road Construction

(Continued from preceding page)

fast as possible. Most of the work is strictly conventional. Small spreads of tractors and scrapers do the grading, assisted by dozers and sheepfoot rollers. Water is added when necessary. The rock, after being sampled, is brought in and dumped according to volume per station. Preliminary blading to eliminate the segregation of dumping is required before the moisture is added, and the material is laid down with the help of rubber-tire rollers.

Major links in the pattern now under construction include an 8-mile stretch on Lake June Road, and another long section of new location which will extend Military Drive parallel to and directly north of Sceyene Road.

County Assumes Maintenance

As the contractors finish each section and "sell" it to the County, county maintenance crews take over and keep the roads repaired when necessary. Dallas County runs its maintenance according to Texas custom and law. Four county commissioners control road maintenance in their own districts. The commissioners are Lynn V. Lawther, W. H. Coyle, John Rowland, and Denver Seale. W. L. "Lew" Sterrett is the County Judge, and Judge Sterrett insists nobody forget the "Lew".

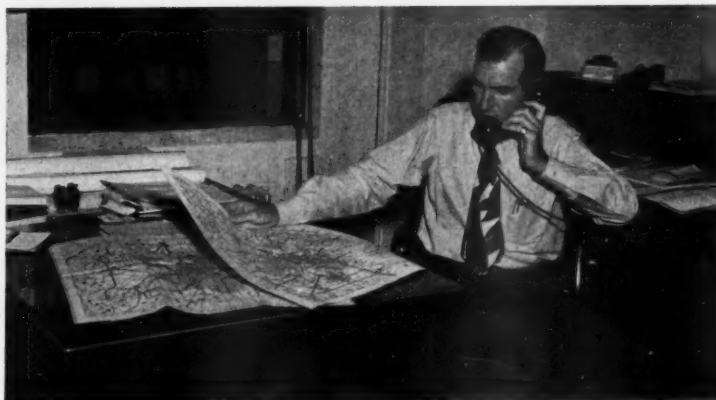
Each district of Dallas County has its own headquarters shop and maintenance supervisor. Each district has several motor graders, and the usual assortment of dump trucks, tractor-mounted loaders, and bituminous equipment. The maintenance crews are fully equipped to apply seal and armor-treatment coats when those become necessary.

Citizens of Dallas County are happy with the projects which have been finished so far, because they represent an unusually high type of county highway. They are being built to stand up under years of wear by traffic ranging from intermediate to heavy, and there is every indication that they will function as designed.

Cummins Elects President; Sends Steel Buyers to Europe

Robert E. Huthsteiner was elected President of Cummins Engine Co., Inc., Columbus, Ind., at the June meeting of the board of directors. Formerly Executive Vice President, he succeeds J. Irwin Miller who became Chairman of the Board. Clessie L. Cummins, founder of the company and formerly Board Chairman, was named Honorary Board Chairman.

President Huthsteiner has announced that for the second time in seven months Cummins has sent representatives to Europe to buy steel and aluminum. H. H. Lurie, the company's chief metallurgist, and J. A. Beaman from



C. & E. M. Photo

Dallas County Engineer Jack Davis is a busy man these days as he arranges right-of-way acquisition for the county's current road expansion program.

the purchasing department are making the flying trip to Belgium, Germany, Luxemburg, Norway, and England to place orders. Cummins decided on

the move when domestic sources indicated they could not supply all of its expected requirements. Officials have found the quality of European

steel satisfactory, and European mills have kept their promises for delivery of material.

Dredge-Pump Catalog

A detailed 8-page catalog on heavy-duty dredging pumps is offered by Morris Machine Works, Baldwinsville, N. Y. The Type G pumps described in this bulletin are available in sizes from 6 to 36 inches. They can be directly connected to diesel engines or electric motors; they have interchangeable liners and accessible stuffing boxes; and they operate over a range of high suction lifts. Morris pumps can be furnished in many types of metal including manganese and carbon steels. General performance data, operating features, and pump parts are described in the catalog, and engineering data are included.

This literature may be obtained from the company by requesting Bulletin 182, or by using the Request Card at page 16. Circle No. 563.



THE DOMOR ELEVATING GRADER, an attachment for "Cat" No. 12 and 112 Motor Graders, adds scores of tasks to the grader's uses. The elevating grader quickly attaches and detaches to convert the grader to and from blade work. Domor Elevating Graders have been job-proved in every type of soil — on every type of job.

HOW TO
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FRED WEBER CONTRACTOR, INC., SPEEDS ROUTE 66 PROJECT—WITH A DOMOR ELEVATING GRADER!

Look at that steady stream of dirt moving up the conveyor . . . look at the sharp, healthy bite the cutting disc is taking!

That full belt and clean cut shows how *one man* — at the controls of a Domor Elevating Grader — can move over 500 cubic yards of hard-packed soil each hour . . . how Contractor Fred Weber dug — to almost perfect grade — the excavation for a 12-foot extension to the existing roadbed, loading excess material directly from the hard packed shoulder.

The Domor — teamed with an economical "Cat" No. 12 Motor Grader — heap-loaded 5-yard trucks in less than 30 seconds . . . cleaned the cut so completely that one blading pass made it ready for the paving crews.

Here's the new and modern way to cut roadwork costs and job-time . . . the way to load, cast, terrace, ditch, or strip! Let your Domor—"Caterpillar" Dealer show you all the advantages of Domor Elevating Grader's big production features . . . how they can work and earn for you. Call on him, today . . . or write Ulrich Products Corporation, Roanoke, Illinois.

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**CHAMPION
DERRICK**

Boom only can be supplied for use with old-style Mast and bottom

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The most complete line of contractors' derricks, hoists, and winches. Write for catalog.

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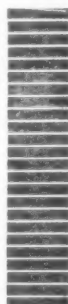
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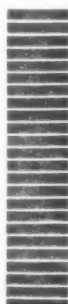
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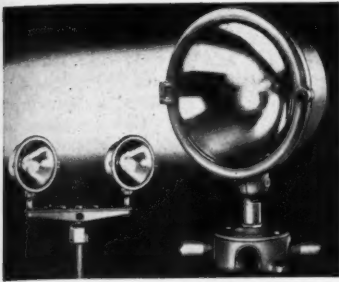
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The Stonco No. 56 spotlight provides 100,000 candlepower with only a 300-watt rating. All wiring is enclosed.

High-Power Spotlight

A new outdoor spotlight providing 100,000 candlepower with only a 300-watt rating has been announced by Stonco Electric Products Co., 489 Henry St., Elizabeth 4, N. J. It is designed to concentrate its entire light output in a long-throw oval-shaped narrow floodlighting beam.

Made of noncorrosive heavy-duty cast aluminum throughout, the Stonco No. 56 spotlight has a universally adjustable cast-aluminum swivel arm, threaded 1/2-inch NPT to fit a variety of standard interchangeable accessories such as a flat base, weatherproof junction boxes, wall brackets, wiring troughs, etc. Up to five units can be mounted to a single cluster light assembly. All wiring is completely enclosed, and the units are fully approved by Underwriters Laboratories, Inc.

Further information may be secured from the company, or by using the Request Card at page 16. Circle No. 675.

New Water Repellent

A clear liquid silicone-base water repellent for exterior masonry surfaces is announced by The Chem Industrial Co., 114 Hippodrome Bldg., Cleveland 14, Ohio. One application is said to keep water out of masonry for periods up to five years. The product is also said to repel soot and dirt, minimize efflorescence, and reduce spalling.

H₂O-NO enters from 1/16 to 3/8 inch into mortar. It then forms a silicone lining for the microscopic masonry pores and waterproofs the pore walls. It does not plug up the pores or prevent transpiration of air, however, according to Chem. It can be used on concrete, concrete blocks, brick, stucco, mortar joints, asbestos shingles, unglazed tile, all types of building stone, marble, etc. Coverage is estimated to range from 100 to 300 square feet per gallon, depending on the porosity of the masonry to which it is applied. The solution is available in 1 and 5-gallon cans and in 55-gallon drums.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 597.

Data on AC Arc Welder

A circular describing the Miller engine-driven ac arc welder and power plant is available from Miller Electric Mfg. Co., Appleton, Wis. The unit is said to deliver a full 200 amperes and it will handle ac or ac-dc electrodes from 1/16 to 3/16-inch inclusive. Two models are available: one with a 3-kw 60-cycle ac 110-220-volt power supply; the other without. Specifications, illustrations, and application data are included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 609.

Manages Cincinnati Division

Byron Stoothoff is now Manager of Division 600 of the Cleco Division of Reed Roller Bit Co., Houston, Texas, manufacturer of Cleco and Dallett air tools. His headquarters are in Cincinnati.

Nation Should Study Its Highway Financing Needs

A million-dollar study of the nation's highway financing needs was proposed at a meeting of the Truck-Trailer Manufacturers Association last July. Harold F. Hammond of the Chamber of Commerce of the United States, Manager of its Transportation and Communication Department, made the proposal. We must find an answer soon, he said, to the problem of how much each type of highway user should pay of the \$5.6 billion a year needed to bring America's roads into proper shape. Leaders in the highway industry should form a committee to prepare the research program, raise the funds, and put the study in action.

Mr. Hammond deplored the tendency of local governments to turn financing of roads over to state governments. Major financing of local roads, he declared, should continue to be a local government responsibility. Uncle Sam's contribution to highway revenues should never be more than the traditional matching 50 per cent, he added, and direction of highway programs should continue to be kept at the state level, with the Federal government acting as coordinator.

Shifted to Explosives Dept.

John M. Martin has been named Assistant General Manager of the Explosives Department of Hercules Powder Co., Wilmington, Del. For the past

four years he has served as Assistant General Manager of the Cellulose Products Department.

Catalog on Car Pullers

A catalog released by American Hoist & Derrick Co., 63 S. Robert St., St. Paul 1, Minn., describes the company's complete line of electric car pullers and suggests uses. There are three American electric car-puller types—capstan, drum, and continuous-rope. The catalog describes each one, explains its applications, and gives specifications.

This literature may be obtained from the company by requesting Catalog No. 100-H-66, or by using the Request Card at page 16. Circle No. 611.



On this highway job between Bardstown and Fredericktown, Ky., a 1 1/4-yd. Thew Lorain shovel, powered by a "Cat" D13000 Engine, loads heavy rock into Athey wagons, pulled by "Caterpillar" D7 Tractors. The contractor is W. C. Snyder, Danville, Ky.

There's a big job ahead

How your equipment stands up in the months ahead has a real bearing on America's fight to be strong and stay free. A vital part of that effort is the \$12,000,000,000 worth of earthmoving and road building needed this year. And we're entering a period that will separate "the men from the boys" in the field of construction machinery.

Military needs and Defense Rated Orders are taking their share of "Caterpillar" production. Shortages of steel and other materials add to the difficulty of supplying the demand for new machines. This means that *present equipment must be kept in use.*

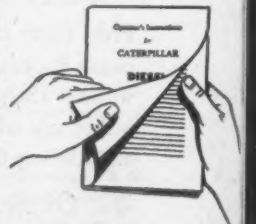
"Cat" Diesel Engines, Tractors, Motor Graders and Earthmoving Equipment are built with the stamina to serve you long and faithfully. But *how long* is up to you and the operation and maintenance you give them. Good care pays off.

You can add many hours to equipment life if you follow sound maintenance practices. Anticipate your parts needs *before* wear goes beyond repair. Talk it over with your "Caterpillar" dealer. He is qualified to give competent opinion. If a part is not readily available, he has the tools and knowledge to rebuild many worn parts — and keep your machinery on the job.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

You're the Doctor

Don't let your engine overheat. Maintain the cooling system, keeping it free of scale, rust and sediment. Use soft or treated water and, when freezing temperatures exist, protect your engine with anti-freeze. Clean the radiator periodically, removing foreign matter from the core by brushing or washing. Use chemical flushing solutions. Prevent engine troubles which come with overheating. Consult your Operator's Instruction Book.



CATERPILLAR

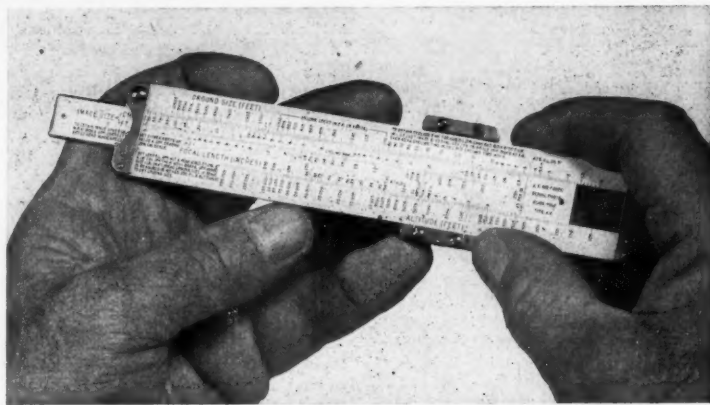
REG. U. S. PAT. OFF.

DIESEL ENGINES
TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

Slide Rule Speeds

Aerial-Photo Work

A new aerial-photography slide rule designed to save time and simplify computation has been introduced by Pickett & Eckel, Inc., 5 S. Wabash Ave., Chicago, Ill. Without reference to tables and old-style calculations, the Aerial Photo Rule gives quick answers to problems like these: (1) comparative size of objects on the ground and in a photograph; (2) the area of land covered by one exposure of film at a given focal length, altitude, and film size; (3) ground feet covered in flight per inch of photograph; (4) speed at which the image moves under the camera lens; (5) cycling time or exposure time in seconds required to cover an image while the plane flies at so many miles per hour, at a given height, with the camera set at a given focal length; (6) image size; if the object is a certain size on the photograph, the rule gives its actual size on the ground; (7) planning; determines the minimum



This new aerial-photography slide rule is made by Pickett & Eckel. Five simple scales give answers to air photo problems.

altitude at which a plane must fly at a given exposure time to give adequate coverage on film.

Designed as a double-purpose rule by the Aerial Photo Division, U. S. Air

Force, the rule bears on one side an altitude scale; a focal-length scale; two image-size scales, one reading in feet and one in centimeters; a ground-size (or foot scale) for settings in either

mph or knots. On the reverse side the rule bears L, A, DF-CF, CIF, T, S, C-D, DI, and K slide-rule scales for general computations.

The rule is made of a nonwarping light metal with white surface and needle-sharp black graduations.

It is available in a 10-inch and a pocket-size model, boxed complete in leather case with manual.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 618.

Diamond Saw Blades

Diamond blades for cutting concrete and asphalt are now produced by Clipper Mfg. Co., 2800 Warwick, Kansas City 8, Mo. The company reports that the blades can cut concrete containing limestone aggregate at speeds up to 19 feet per minute when cutting at a depth of one inch. Asphalt containing the same aggregate can be cut to the same depth at a rate of 12 feet per minute. The blades are manufactured in diameters from 8 to 30 inches and in thicknesses of 5/32 to 7/64 inch, for use on any type of concrete saw.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 613.

Diesel Crawler Tractor

A detailed catalog on the TD-9 diesel crawler tractor is available from International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill. It points out that the TD-9 has a drawbar horsepower of 40.5 and is available in two gage widths: 44 and 60 inches. Cutaway illustrations show the internal construction and working parts of the tractor and engine. This 32-page booklet also contains many field photographs of the TD-9 in operation. Complete specifications and detailed data on operation, maintenance, and service are included.

This literature may be obtained by requesting Form CR-313-A, or by using the Request Card at page 16. Circle No. 688.

For Hyster in Northwest

Graydon Broms has been named a district representative for Hyster Co., Portland, Ore. His territory includes most of Oregon, Washington, Idaho, western Montana, Yukon Territory, British Columbia, and Alaska.

SAMSON BAR CUTTERS

- All Steel Construction
- Unbreakable Frame
- Easy Operation
- Immediate Shipment



Write for catalog of Metal Working Equipment

CAPACITY	No. 20	No. 23	No. 26
Rounds	3/4"	3/4"	3/4"
Squares	1/2"	5/8"	3/4"
Flats	2"x1/4"	2 1/2"x5/16"	2 1/2"x3/8"
Concrete Bars	3/4"	1/2"	3/4"
PRICE	\$44.90	\$60.30	\$68.50

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We want every purchaser or prospective purchaser of one of our engines to know how his local GM Distributor and Dealer, with their factory-trained servicemen, stand back of the product. They in turn are backed by the knowledge that Detroit Diesel supports them strongly in their adherence to this policy.

1. Installation Inspection:

The GM Diesel serviceman inspects and checks the engine without cost to the owner; whenever possible this is done before the engine is put to work. He explains how to successfully operate the engine and the "preventive maintenance" necessary for best results in days to come.

2. Performance Inspection:

From thirty to sixty days after the engine has begun its job, another inspection is provided without charge. The GM Diesel serviceman makes any adjustments that may be required and tunes up the engine to its best performance.

3. Owner's Service Policy:

Besides the above inspections, GM Diesel owners are protected by the exceptional warranty mentioned in the owner's service policy.



DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES...Up to 275 H.P. DETROIT 28, MICHIGAN MULTIPLE UNITS...Up to 800 H.P.

GENERAL MOTORS



DIESEL BRAVN WITHOUT THE BULK



Jacks Lift Bridge Total of 17 Feet

Concrete Piers Enlarged for Raising Steel Superstructure In Four Sections, 2½ Feet at a Time; Traffic Maintained

By WILLIAM H. QUIRK
Eastern Editor

A DELICATE operation in heavy construction has been under way in Georgia where a 1,500-foot steel-girder and concrete-deck bridge has been raised a total distance of 17 feet. The bridge carries Georgia State Route 43 across the Savannah River, north of Augusta, joining Lincoln County, Georgia, with McCormick County, South Carolina. The work was a project of the State Highway Department of Georgia, but Federal financing stood the cost, since the raising was occasioned by the new reservoir being formed by the U. S. Corps of Engineers' Clark Hill Dam, under construction about 20 miles downstream.

When the bridge was built in 1938, the design conformed to conditions expected from the proposed construction of a dam at a downstream location. This project did not materialize, however, and the level of the new Government-created reservoir will be 25 feet higher than the earlier discussed lake. The 335.0 (extreme high water) elevation of the new power pool would have the waters of the reservoir lapping at the deck of the bridge.

Hence a contract was awarded by the Georgia State Highway Department for raising the structure 17 feet. Cornell-Young Co. of Macon, Ga., contractor on the original construction of the bridge, was low bidder with an estimate of \$460,974.52. The painstaking and precise work of raising the bridge and still maintaining traffic was started in May, 1950, and is expected to be completed this month.

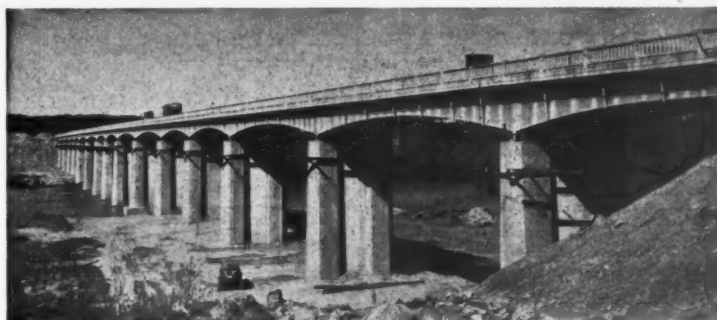
Existing Bridge

The substructure of the existing bridge consists of 15 intermediate piers and 2 end bents of reinforced concrete, numbered consecutively from the Georgia to the South Carolina side. The plate-girder superstructure, designed for H-15 loading, is made up of 8 spans at 82 feet 1½ inches and 8 spans at 105 feet 4½ inches. From bent 1 to 2 is a short span, followed in order by two long spans, two short, two long, two short, two long, two short, two long, ending with another 82-foot 1½-inch span between bents 16 and 17.

Piers 3, 7, 11, and 15 are fixed anchor piers, while expansion joints are over piers 5, 9, and 13. These three expansion joints divide the bridge into four sections, each 375 feet long and each with two long spans at the center and a short span at each end. In raising the bridge, the four spans making up each of the four sections are lifted together.

Each span of the superstructure has two built-up girders, 21 feet apart on centers. These girders are 8 feet 4½

inches deep at the piers, decreasing in an arc to a depth of 4 feet ½ inch at the center of the span. Near the top the girders are joined by 27-inch WF 91-pound floor beams spaced at 16-foot 4-inch centers, over which run four 16-inch I-beam stringers supporting the 7½-inch reinforced-concrete deck slab. A 24-foot roadway is flanked on each side by a 17½-inch-wide curb with concrete guardrail. The mean water level of the Savannah River is 265.6 as compared with the 335.0 elevation of the reservoir pool.



C. & E. M. Photo

This is the upstream side of the Savannah River Bridge, from the Georgia side, showing all piers now encased in the new concrete which enlarges their cross section.

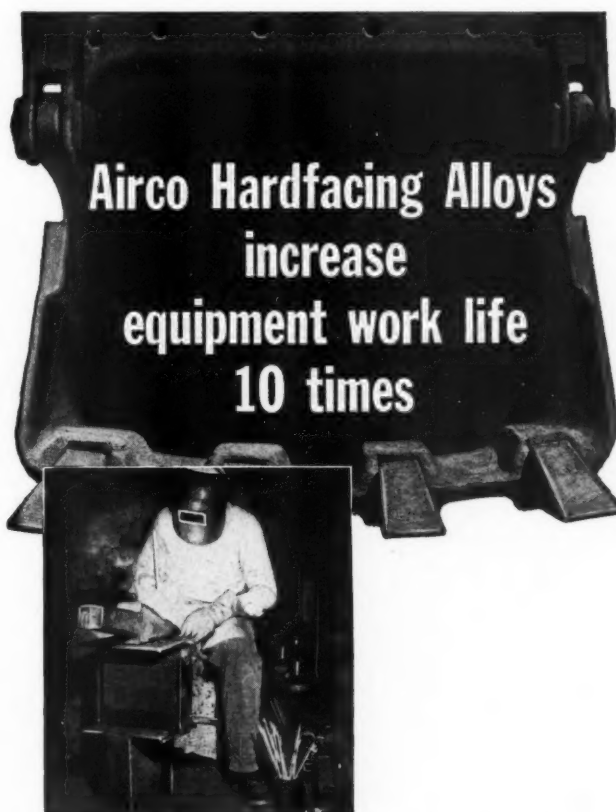
Enlarging the Piers

The existing piers, made up of two columns with a connecting web wall, were first enlarged to provide jacking space. Footings for the four anchor piers, 3, 7, 11, and 15, were enlarged from 10 x 10 feet to 14 x 20 feet from the top of footing down to bedrock.

This increase in size was carried up an additional 5½ feet above the top of footing. Other pier footings were left as they were.

Above the footings, all piers were enlarged with a minimum of 12-inch encasement of concrete on three sides.

(Continued on next page)



Worn machinery and equipment need no longer mean costly replacements. Today, surfaces rebuilt with Airco Hardfacing Alloys add many months to equipment life and, in many cases, improve the operating characteristics.

For example, a large contracting firm found that hardfaced manganese bucket teeth last two to six times longer than untreated teeth. Using Airco Self-Hardening Alloy, they lay a stringer bead along the edges of the bucket teeth. This alloy, designed to counteract impact and abrasive wear because of its tough, homogeneous characteristics, saves

thousands of dollars in equipment work life.

But this is only one of the many Airco Hardfacing Alloys used in their welding shop to save time, trouble and money. They follow a conscientious program of hardfacing... a program that helps prolong equipment work life and prevents costly "down-time."

You, too, can enjoy these same time and money savings. Your nearby Airco office will gladly show you how these cost-saving Airco Hardfacing Alloys will help you with your particular problem.

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AIRCOLITE No. 59...

For reclaiming bucket teeth and lips used in sand and gravel pits—dredge screens—pulverizer hammers—mixer blades, this cast alloy rod is recommended for application where abrasion resistance is particularly important. Deposit acquires a high polish in service, and maintains its high hardness at temperatures up to 800°F. Applied electrically or by gas process. Deposits test from 54-59 on Rockwell "C" scale.



AIRCOLOY No. 6...

For refacing exhaust diesel valves on "cats"—cranes—pumps and shovels, Aircoloy No. 6 gives excellent corrosion resistance... retains hardness and impact and abrasion resistance at temperatures above 700°F... test from 43-47 on Rockwell "C" scale. While recommended for application by gas process, rods suitable for AC or DC electric application are available.



AIRCO TUNGSTUBE...

When building up grader blades—road plows—dredge pump cutters—scarifier teeth—churn drills, use tungsten carbide particles encased in a steel tube for application by either oxyacetylene method or electric arc—AC or DC. Used as a diamond substitute for earth removal and drilling operations. Hardness of tungsten carbide particles are over 80 Rockwell "C".

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Air Reduction supplies Oxygen, Acetylene and other industrial gases... Calcium Carbide... and a complete line of gas cutting machines, gas welding apparatus and supplies, plus arc welders, electrodes and accessories. Ask us about anything pertaining to gas welding and cutting and arc welding... we'll be glad to help you.

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Jacks Lift Bridge Total of 17 Feet

(Continued from preceding page)

increasing to an average of 5 feet on the inside where the jacking was to be done. At the top these columns had maximum dimensions of 8 x 6 feet. The original cap at the top of the columns, 3½ feet high x 3 feet wide x 30 feet long, was cut away in enlarging the piers, but the 15-inch curtain wall was continued to the top. When the 17-foot raise is effected, a new cap will be poured, 4½ feet high x 6 feet wide x 30 feet long, with its top 17 feet above the level of the original cap. Elevation of the new top of cap will be 337.0.

In enlarging the four anchor-pier footings, the contractor timed his work to coincide with low river stages, so that only two of the piers were actually under water. At one of these the water was so shallow that the work was carried on within a sandbag cofferdam. At the other, where about 10 feet of water was encountered, sheet-metal casings were erected to the dimensions of the enlarged section as forms for the concrete.

Concrete Batch Plant

For the 4,000 and more cubic yards of concrete required for the project, the contractor set up a sidehill batch plant on the downstream South Carolina end of the bridge. Bulk cement was stored in a 150-barrel bin, and the aggregate in a 120-ton bin, both Blaw-Knox. Materials were shipped to McCormick, S. C., on the Charleston & Western Carolina railroad, a 6½-mile haul from the bridge site.

Penn-Dixie cement from Clinchfield, Ga., was unloaded from a coal trestle into a truck-mounted box holding 35 barrels. At the plant the truck discharged directly into the cement bin, eliminating the use of worm gear and elevator. Weston & Brooker Co. of Camak, Ga., supplied the aggregate—stone and stone screenings for the sand—which was unloaded from hopper-bottom cars into trucks beneath the trestle. At the plant the trucks emptied directly into the bin from a higher position on the hill, without requiring a crane.

Water for the mix was pumped from a well into a tank at the plant by a Deming electric-driven pump. Since the concrete pours were in small amounts at a time, a single Jaeger 2-yard transit mixer handled the job requirements. Water was also pumped up to the bridge deck where it was stored in a 1,200-gallon tank, and distributed the length of the structure through a 2½-inch gravity feed line. Electric wiring and a compressed-air line were also strung out for the length of the bridge along the curb. Air was furnished by two 105-cfm compressors—a Worthington and a Joy-Sullivan. Valves, tees, and electric connections were provided at each pier for power tools, washing forms, curing concrete, etc.

Maintaining Traffic

According to the specifications, the contractor was required to maintain one-way traffic over the bridge during the construction, without more than an hour's delay. Only during the actual jacking operations was traffic kept off the bridge. In raising the bridge 17 feet, it was also necessary to lengthen the structure by adding a 31-foot 6-inch span at each end. Thus the end bents became intermediate bents and new end bents were added.

Temporary spans were erected at each end of the bridge, skewed downstream off the center line of the structure so as not to interfere with the building of the approach fills or the new end bents. They consisted of bents made up of two H-beam piles connected by channels carrying a pair of



C. & E. M. Photo

A Wright pneumatic saw cuts lumber for timber ramps to connect the four sections of the bridge during the jacking operations.

18-inch I-beam stringers that supported a timber deck and roadway. At each pile column was a Sasgen hoist for raising the stringers on this tem-

porary span as the bridge itself was jacked. Other cross channels were installed as supports for the stringers at the higher level. When the approach fills are also increased 17 feet in height, the temporary one-way spans will be removed.

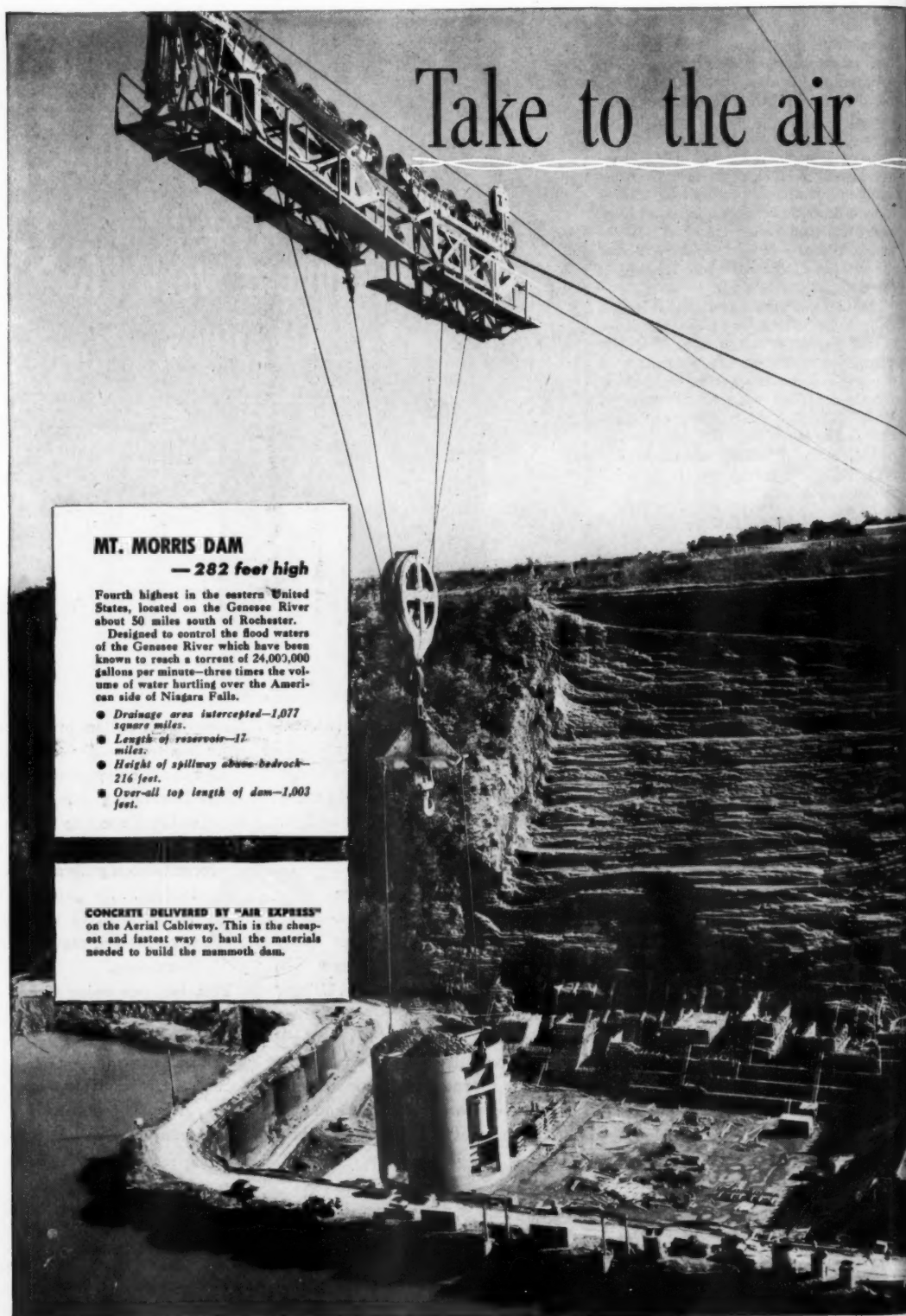
During the construction, traffic was regulated by green-red stop-and-go lights at each end of the project. They were controlled from a house set up at the center of the bridge where the operator commanded a view of the two approaches.

Earthwork for the two approach fills, involving 129,000 cubic yards of material, was subbed out to R. A. Bowen, Inc., of Macon, Ga. The dumped-riprap item called for a 2-foot blanket of stone measured at right angles to the slope, to prevent erosion of the high fills; it was subbed to Dixie Explosives Service, Inc., of Monticello, Ga.

Concrete Placing

The Virginia Steel Co. of Birmingham

(Continued on next page)



MT. MORRIS DAM — 282 feet high

Fourth highest in the eastern United States, located on the Genesee River about 50 miles south of Rochester.

Designed to control the flood waters of the Genesee River which have been known to reach a torrent of 24,000,000 gallons per minute—three times the volume of water hurtling over the American side of Niagara Falls.

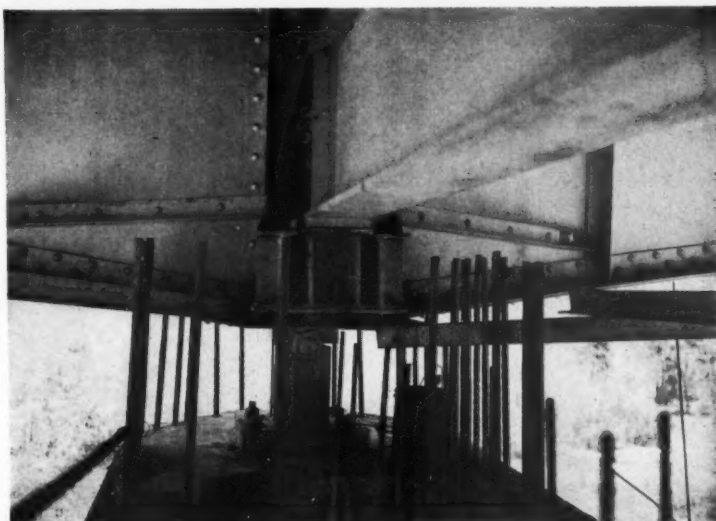
- Drainage area intercepted—1,077 square miles.
- Length of reservoir—17 miles.
- Height of spillway above bedrock—216 feet.
- Over-all top length of dam—1,003 feet.

CONCRETE DELIVERED BY "AIR EXPRESS" on the Aerial Cableway. This is the cheapest and fastest way to haul the materials needed to build the mammoth dam.

Take to the air

ham, Ala., supplied the reinforcing steel; Ingalls Iron Works supplied the structural steel and the 1/4-inch steel plate from which the forms for the pier enlargement were built. Fabrication was done at the site, with the plates being welded together by a P&H welding machine. A set of forms was made up in 10-foot sections to pour the 60-foot piers, as well as several shorter sections under 3 feet in height. Forms were shaped to the batter of the piers, and were supported on a collar cut to the size of the column section and web wall. The collar came in two pieces, and was bolted together for assembling around the piers. The steel-plate forms were strengthened with 4 x 4 x 3/8-inch angles as stiffeners at the ends, and 6-inch channels at the center.

For bonding the new concrete to the old, keyways were cut into the existing piers on 3-foot centers both ways. These keyways were 1 1/2 inches deep, 10 inches wide, and 18 inches long. They also served another purpose, for when the concrete was cut away at the cor-



C. & E. M. Photo

Under the bridge deck at fixed bent 15, showing the jacking beam riveted to the girder, and the jacking block welded to the 27-inch WF 91-pound floor beam.

ners of the piers, one of the original reinforcing rods was exposed at each keyway. Ties from the steel forms were tack-welded to the exposed rods, thus giving the forms additional stability during the concrete placing. Men working from scaffolds cut the keyways with jackhammers.

All the piers reached by land were poured up to the 30-foot mark with crane and bucket. The truck mixer discharged the 3,000-pound concrete into an Insley 1-yard bucket that was handled by a Northwest crane with a 60-foot boom. For the higher pier pours, and those bents in the water, the concrete was placed from the bridge deck. An Osgood truck crane, with a short 25-foot boom, lowered the bucket from the bridge down to the forms. A chute was welded to the bottom of the bucket for greater ease in discharging the concrete into the forms. This was of particular help on the sides where there was only a 12-inch clearance between pier and forms. Beebe 5-ton winches, fastened beneath the bridge, pulled the bucket to the forms with a cable and hook, since the crane only lowered the bucket vertically over the sides.

Tight Quarters

Concrete placing continued in this manner at the piers to within 10 feet of the top of the old concrete. At that point the crane and bucket could no longer function in the limited space beneath the bridge. Four holes, 18 inches square, were then cut through the concrete deck at each pier, two on a side and far enough apart to clear the floor beam beneath. Steel lids were made with four legs on them to close the holes when not in use, and to prevent their being knocked off by passing traffic. Concrete was poured through these holes until the columns and web wall were brought up to the level of the old cap.

At this point three timber ramps were built, 55 feet long x 10 feet wide, to provide a 9-foot clear roadway. The ramps were assembled on the bridge deck, the lumber being cut with a Wright pneumatic saw. They were constructed to connect the four sections of the bridge during the jacking, being spotted over the expansion joints at piers 5, 9, and 13. The metal teeth in these 5-inch-wide expansion joints were first cut out on the downstream half of the slab, while traffic was directed over the upstream half. The timber ramps then carried traffic over the open joints while the teeth from the rest of the joint were cut out on the upstream side.

The ramps were then shifted to the center of the bridge, where traffic was carried, leaving a minimum 5-foot clearance on each side. This was just enough room in which to maneuver a

(Continued on next page)

and get it there

Aerial cableway pours
a million cubic yards of concrete
to build Mt. Morris Dam

● This operation makes you dizzy! If you rode the aerial cableway across the Genesee River, you'd be over 500 feet above the foundations of Mt. Morris Dam, near Rochester, New York.

The main cable or "gut" as it is called, is an American 3-inch Locked Coil Track Strand 1,650 feet long suspended between two towers.

The carriage shuttles back and forth hauling 8 cubic yards of concrete to the dam every 4 1/2 minutes. By the time the dam is finished, more than 1,000,000 cubic yards of concrete will have been poured.

All over this project, American Tiger Brand Wire Rope is doing a stupendous job. It hauls the carriage with a 3,800-foot endless rope. Because of the hard wear this cable must take, they used a 1 1/8" 6 x 30 flattened strand rope. This is noted for its superior abrasion resistance.

The hoist cable was selected for its strength and resistance to fatigue and wear. This is a 3/4" 6 x 21 Tiger Brand Wire Rope made of improved plow steel.

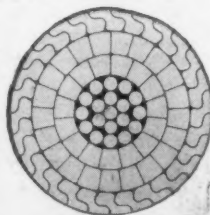
The "Button" line, and many of the shovel ropes were also Tiger Brand. Some of the Tiger Brand Rope was previously used to help build the giant Shasta Dam. Later it was brought to Mt. Morris and used on shovels and clamshells until it finally wore out. This is the kind of service that has made Tiger Brand the favorite choice of contractors in all parts of the country.



CABLEWAY TOWER—Two of these support the main cable approximately 563 feet above the foundation of the dam. The weight on the "gut" is about 35 tons.



THE "GUT" or main cable—a U.S.S. American 3-inch Locked Coil Track Strand 1,650 feet long. Interlocking construction holds each wire in its proper position so that it cannot unravel even if a wire should break.



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TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM, SOUTHERN DISTRIBUTORS • UNITED STATES STEEL EXPORT COMPANY, NEW YORK



AMERICAN TIGER BRAND WIRE ROPE

Excellay Performed

UNITED STATES STEEL

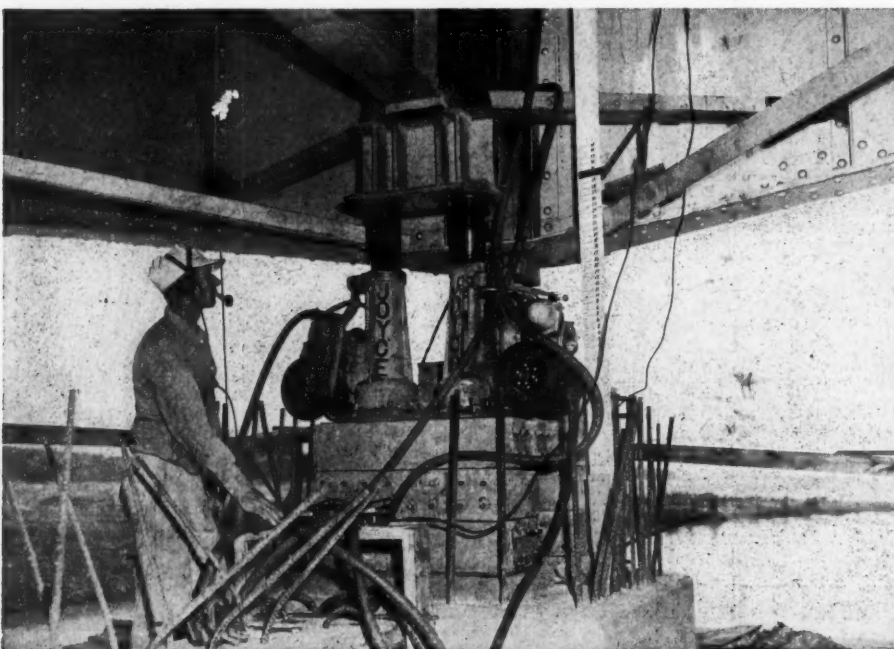


C. & E. M. Photo

Fred B. Miller (left), Superintendent for the general contractor, and C. W. Butt, Resident Engineer for the Georgia Highway Department, stand beside a ladder leading down to the jacking beams through a hole cut in the deck.



This view from underneath the Savannah River Bridge shows clearly the special jacking beams running transversely between the two main bridge girders. Three feet from the girders on each side are the jacking blocks, welded to the jacking beams and to the floor beams. Notice the fresh-concrete marks on the bridge piers and web wall. Concrete was poured and jacks were lowered through that hole in the bridge deck.



One of the crew at his post beside two 100-ton jacks; he is watching the gage stick which is marked in $\frac{1}{4}$ -inch increments. Note the precast-concrete blocks in this view, and in the view at right taken after a lift. Lead plates $\frac{1}{16}$ inch thick and 6 inches square were laid between these blocks to bring them to precise grade. After each $2\frac{1}{4}$ -foot lift, concrete was poured around the blocks, making them a permanent part of the built-up piers.

Jacks Lift Bridge 17 Feet

(Continued from preceding page)

converted Hyster fork-lift truck for setting forms for the final 17 feet of pier.

Jacking Preparations

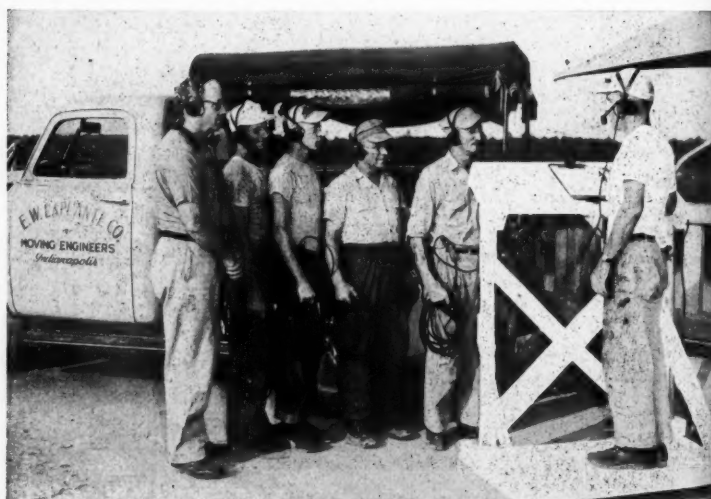
With the expansion joints cut away to prevent possible fouling during the raising of the bridge, the contractor continued with his jacking prepara-

tions. Special jacking beams were installed at each pier, running transversely between the two main bridge girders to which they were riveted. They were 27-inch WF 114-pound sections, and were directly below the floor beams. Some struts were removed in the bot-

(Continued on next page)

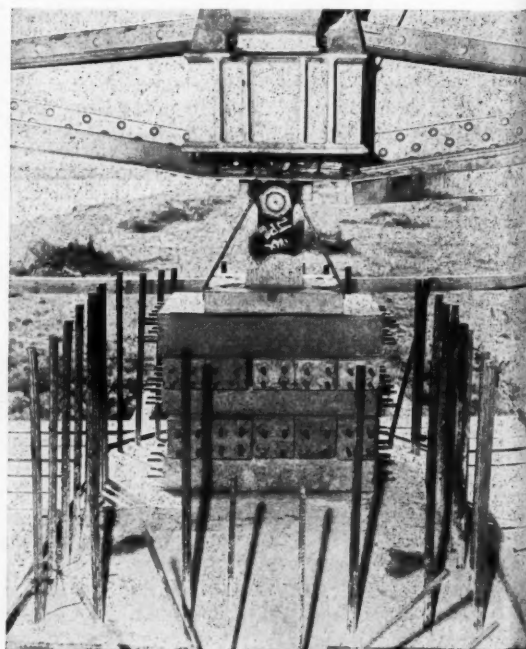


E. W. LaPlante Co., which subbed the jacking operations, used twelve 100-ton and four 50-ton Joyce-Cridland air-operated mechanical jacks with a total capacity of 1,400 tons. Here a 100-ton jack is lowered to a pier through a hole cut in the bridge deck.



Only 15 jack operators were needed. Here some of them, wearing RCA voice-activated 2-way headphones, get a briefing at the communications desk. Ken Adair, President and General Manager of LaPlante Co., is on the left.

Photos Courtesy of Joyce-Cridland Co.



tom and diagonal bracing of the superstructure to make room for these special beams, and the contractor had an option to remove the beams and replace the struts when the jacking was completed, or leave the new beams where they were. The latter was chosen.

Jacking blocks were then welded to the jacking beam and the floor beam above it on each side, 3 feet on centers in from the main bridge girder. The block consisted of 12-inch WF 53-pound sections with stiffener plates across the bottom and top. Plates were inserted between the top of the jacking block and the bottom of the floor beam, followed by shims which were driven in and tack-welded so as to form an even bearing surface. Other plates were welded to the bottom of the block where the jacking force was applied. Plates were about a foot square and from ½ to 1½ inches thick.

In the meantime approximately 4,000 concrete blocks had been cast in a yard near the batch plant for use in raising the piers the required 17 feet. The precast blocks were made with 5,000-pound concrete in several sizes, mostly 7½ x 7½ x 28 inches or 7½ x 5½ x 18 inches, and reinforced with straight rods. These rods projected 3 inches from the blocks so as to make a good bond with the next course above as the bridge was raised. Blocks were left within the forms to become a permanent part of the pier when concrete was poured around them.

Jacking 1,000 Tons of Bridge

Actual jacking of the bridge was subbed to the E. W. LaPlante Co., contractors and moving engineers of Indianapolis, Ind., which furnished the necessary equipment to raise the bridge, together with the skilled personnel required for this delicate operation. Each of the four sections raised at a time was 375 feet long, composed of four spans with respective lengths of 82 feet 1½ inches, 105 feet 4½ inches, 105 feet 4½ inches, and 82 feet 1½ inches. Each section weighed approximately 1,000 tons.

To lift this weight, the subcontractor used twelve 100-ton and four 50-ton Joyce-Cridland air-operated mechanical jacks with a total capacity of 1,400 tons. The jacks were operated with a Worthington Blue Brute 500-cfm air compressor. Jacking was done from the five piers making up a section. At the center of the five piers there were two 100-ton jacks on each side. At the adjoining piers there were two 100-ton jacks on each side, while at the end pier in the section there was a 50-ton jack on each side.

After each section was raised 2 feet 6 inches, the general contractor extended the piers up a like distance. Then the next section was raised 2 feet 6 inches, followed by the piers, until the entire bridge was raised 2 feet 6 inches as the concreting crew worked right behind the jacking crew. The entire raise of 17 feet was done with jacks and pours of 2 feet 6 inches repeated six times, and a final lift of 2 feet. Jacking started at the South Carolina side and proceeded toward the Georgia side.

All jacks were raised at the same time so that the entire section was not out of level more than half an inch. No jacking was done when the wind was blowing more than 15 mph, and of course no traffic was permitted on the bridge during the actual raising. After the 2½-foot lift had been made, traffic again passed over the structure, using the timber ramps that spanned the two different levels at the expansion joint.

Blocking was carried right up as the jacking proceeded. Forms enclosed the precast cribbing; the concrete pours were made with 72-hour portland-cement concrete. Steel shims were in-

(Continued on next page)



Joyce-Cridland Co. Photo

One-way traffic was maintained over the bridge at all times except during actual jacking. After a lift had been made, cars again passed over the structure, using timber ramps that spanned the two different levels at the bridge expansion joints.

GENERALS

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Extra Traction and Speed . . . to do More Jobs Anywhere

Faster! Easier! At Lower Cost!



GENERAL D. T. L. For off-the-road jobs where maximum traction is required. Broad, deep, sharp, self-cleaning tread lugs dig deep for positive grip on soft surfaces. No slipping, sliding.

GENERAL H. C. T. For some work off-the-road, most work on. Deep, saw-tooth safety tread and sturdy shoulder cleats develop extra traction. Rolls smoothly, safely, stops fast.

THE GENERAL D.T.L.

THE GENERAL H.C.T.



GENERAL H. C. T. Thicker, tougher tread for extra traction through sand, gravel, slush, mud. More original and recap miles.



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GENERAL INDUSTRIAL PNEUMATICS Wide-Base tires for small equipment. More cushion, more wear.

REQUEST GENERAL TIRES ON YOUR NEW EQUIPMENT

Jacks Lift Bridge Total of 17 Feet

(Continued from preceding page)

serted at the tops of the bents to bring them to precise grade. The shims were 1/4 inch thick. Reinforcing rods in the 10-foot pier lifts were carried on up in the 2 1/2-foot increments of the raised portion.

Quantities and Personnel

The major items in the contract for raising this 1,500-foot steel-girder and concrete-deck bridge included:

Earthwork	129,000 cu. ft.
Concrete	4,033 cu. yds.
Reinforcing steel	458,000 lbs.
Bridge excavation	1,300 cu. yds.
Dumped riprap	16,000 cu. yds.

Cornell-Young Co., the general contractor, employed a force averaging between 30 and 40 on the project under the general supervision of G. P. Jones, Vice President, with Fred B. Miller, Superintendent.

K. F. Adair is General Manager of the E. W. LaPlante Co. which did the jacking. Dave Stockman, Engineer for Joyce-Cridland, was on hand during jacking operations.

For the Georgia State Highway Department, Cecil W. Butt is Resident Engineer. The project is located in Division 2 of which R. G. Ray, Jr., is Division Engineer with headquarters in Augusta. The Department is headed by Jim L. Gillis, Sr., Chairman of the State Highway Board. M. L. Shadburn is State Highway Engineer, with C. W. Left-

wich, Construction Engineer, and C. N. Crocker, Bridge Engineer.

Plans for this project were drawn by Patchen & Zimmerman, Architects and Engineers, Augusta, Ga.

Shoemaker Is Buda V. P.

L. F. Shoemaker has been elected Vice President of The Buda Co., Harvey, Ill. During his 31 years with the company he has held positions in service, engine field testing, retail sales, manufacturer sales departments, and has served as regional representative and in distributor and branch retail sales. For the last 12 years he has been a sales executive—Manager of Industrial Engine Sales Division, and then Engine Sales Manager.

How to Salvage Bellows Seals

Did you know that about 50 per cent of all worn or damaged bellows seals can be returned to immediate service if they are removed carefully and the cork-leather gasket and cork facing are replaced?

It has long been common practice to replace rather than salvage or re-condition final-drive bellows seals in track-type tractors. But Caterpillar Tractor Co. is back of a program to conserve these seals as well as many other machine parts made of alloy steels, copper, aluminum, brass, and bronze.

Five simple tools made from materials found in most service shops do the trick, Caterpillar says. One is a T-handle for removing the seals. Others are a shaping tool or "dolly" with shaping pliers to iron out corrugations. Then there is a seal spreader to expose breaks and make them accessible for repairs, and a crowfoot punch for bringing the retaining rings back to shape on a flat steel plate.

Removal should be careful; many bellows are rendered useless from rough removal. By replacing the gasket and facing you can return half your bellows to service. Others damaged during operation or removal can be repaired by soldering patches of thin brass (salvaged from seals which can't be repaired) over the fractured area. Simple.

Fuel-Oil Conditioner

A 4-page folder about Powersol, a fuel-oil conditioner for No. 5, No. 6 and domestic oils, is available from Power Plant Products Co., 93 Federal St., Boston 10, Mass. The product is said to be safe to handle or store, non-explosive, and non-corrosive. Added to fuel oil, it is designed to eliminate tank sludge, clean clogged fuel lines and dirty strainers, reduce carbon at the burner nozzles or tips, and improve combustion.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 686.

Catalogs Hard-Facing Rods

There's a new folder out on Wear-Arc hard-facing alloys made by Alloy Rods Co., York, Pa. The first half of it describes wear patterns and suggests preferred and alternate hard-facing alloys to use. It explains the properties of the rod, tells the sizes it comes in, identifies it by coating color, lists applications, and outlines the welding procedure.

The second half organizes data by industries—there's a full page on general construction, excavating, and dredging; and another on rock production. Here the catalog lists parts subject to wear, such as mixer blades, crusher rolls, plows, post-hole diggers, and shovel teeth; describes the type of wear; tells the rod to use when building up carbon steel and manganese steel; and suggests the Wear-Arc hard-facing alloy overlay to use.

This literature may be obtained from the company or by using the Request Card at page 16. Circle No. 629.

Film on Material Handling

A new color-sound film called "Top Performance", shows how modern materials handling with industrial trucks and hoists reduces physical exertion, work, time, and floor space. It is available from the Philadelphia Division, Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia 15, Pa., and is designed for showings before materials-handling, engineering, general business, and student groups. The 22-minute film shows a variety of attachments on the respective trucks for handling bulk materials.

REPEAT ORDERS

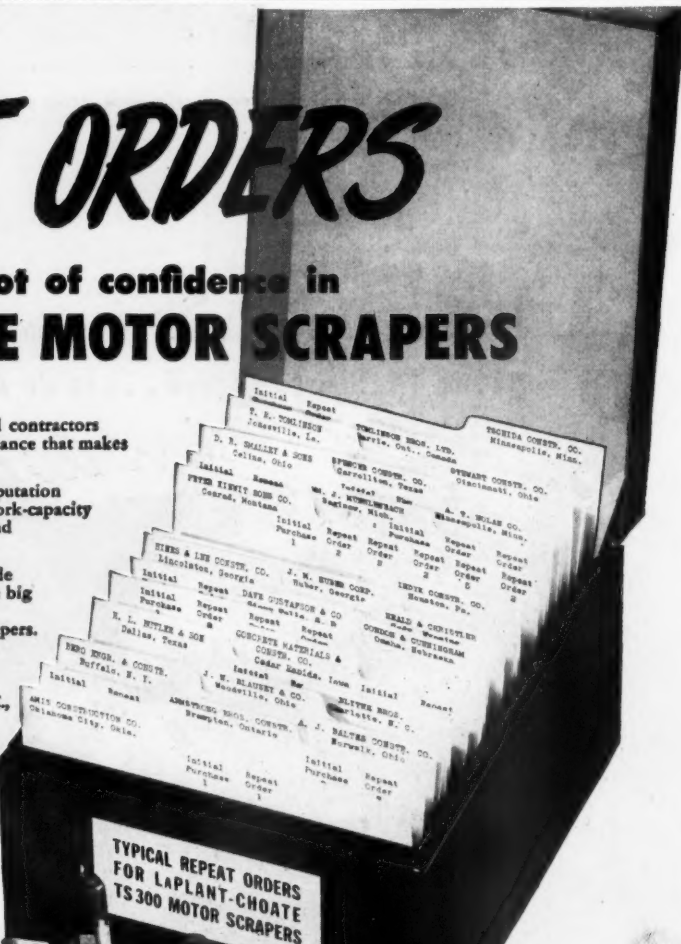
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THERE'S one big reason why so many successful contractors repeat on buying Motor Scrapers...the job performance that makes earthmoving profitable.

LaPlant-Choate Motor Scrapers have earned their reputation as dependable profit-makers. They've proved their work-capacity under all kinds of operating conditions from one end of the country to the other.

The experience of successful outfits which have made money is worth considering. When you plan for the big construction years ahead, find out why so many profit-wise contractors are 100% sold on Motor Scrapers. Call on your LaPlant-Choate distributor today for a complete description of the many Motor Scraper advantages that will put money in your pocket. LAPLANT-CHOATE MANUFACTURING CO., INC., Cedar Rapids, Iowa.



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2- and 4-yd. Scrapers for track-type and rubber-tired industrial tractors.



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A squelch control is now incorporated in the Handie-Talkie portable FM radiophone.

Portable Radiophone With Squelch Control

A new version of the Handie-Talkie portable FM radiophone that incorporates an adjustable squelch has been introduced by Motorola, Inc., 4545 W. Augusta Blvd., Chicago 51, Ill. The squelch is said to reduce the annoyance of tube and circuit noises normally encountered in an FM receiver in the absence of a signal. The control, mounted on the power-supply chassis, provides a normal operating range of no-squelch from 25 to 50-decibel noise reduction. It also reduces audio distortion resulting from the portable being used in fringe areas, the company says.

The Handie-Talkie portables are available with either wet or dry-cell power supplies, for operation in either the 25 to 50-megacycle or the 152 to 174-megacycle bands.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 594.

Waterproofing Paint

A waterproof paint designed for interior or exterior use in any climate is available from Industrial Plastics Co., P. O. Box 5146, Jacksonville 7, Fla. Seal-Rite is composed of dry powdered ingredients. When mixed with water and brushed into the surface of concrete, concrete block, cinder block, stucco, brick, masonry, plaster, etc., the paint will expand as it dries, forming a solid permanent seal against water and moisture.

The paint is available in white and in nonfading colors. It is not affected by heat, moisture, or other climatic conditions, the manufacturer reports, and it is available in various container sizes ranging from 2½ to 300 pounds. Each pound is said to cover about 10 square feet of surface area.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 570.

New Tool Container

A new Proto master tool chest is available and two socket-set boxes have been redesigned, announces Plomb Tool Co., 2209 Santa Fe Ave., Los Angeles, Calif. The new tool chest measures 27 x 12 x 15 inches. It has two full-width 2¼-inch-deep two-compartment drawers, four half-width 1¼-inch-deep three-compartment drawers, a full-width top section partitioned into three compartments, and a 21¼-inch-wide tote tray with three compartments. The top is supported on a full-length hinge and overlaps the balance of the chest to make a tight seal. A drop front covers all drawers when the chest is closed and permits locking.

The Proto No. 5295 and No. 5495 socket wrench boxes, for ¾ and ½-inch drive sets respectively, have been redesigned. Their strength has been increased and their appearance improved by rounding the corners and using a drawn one-piece construction with laps for the top and bottom.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 581.

H. W. Goodall of Dixon Dies

The death on June 16 of Howard W. Goodall, in his 78th year, deprives Dixon Valve & Coupling Co., Philadelphia, of its founder and President.

Mr. Goodall, active for more than 60 years in the development of rubber goods and hose couplings, was one of the founders of Goodall Rubber Co., specializing in contractors' hose, belting, etc. In 1916 he founded the Dixon Valve & Coupling Co., and from then on devoted himself entirely to the interests of that company.

Dragline-Bucket Catalog

Dragline buckets for all digging conditions are featured in Catalog No. 188 prepared by Electric Steel Foundry Co., 2141 N. W. 25th Ave., Portland 10, Ore. The catalog describes and illustrates all five types of Esco draglines: the featherweight, medium-weight, heavy-duty, and extra-heavy-duty buckets, and the stripping drag-

line buckets.

Specifications are given in easy-to-read tables and are illustrated with model views of the representative buckets. Details on the construction of Esco buckets are included along with additional brief data on Esco teeth, blades, and rigging.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 615.

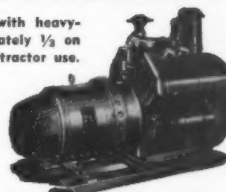
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300 to 10,000 Watts, A.C. or D.C. Quality built for 25 years. Famous for long, dependable service.

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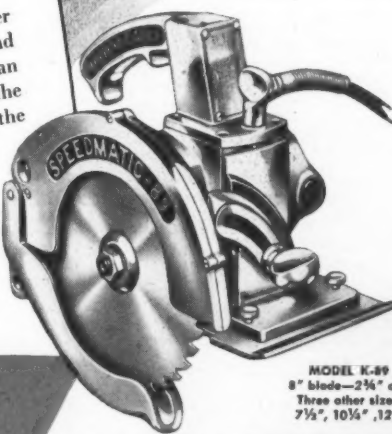
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HOLD ON! When you're hunched over a roof's edge, perched on a ladder, or leaning from a scaffold... you'll find it safer and easier to use a Speedmatic!

Here's why: Speedmatic is the balanced one-hand power saw—doesn't require both hands to operate—one hand always free for support... doesn't force you to lean perilously near the edge. The blade is on the right, the safest location. While sawing, Speedmatic rests on the main piece—no risk of saw falling to the ground. At the finish of cut-offs it doesn't suddenly nose-dive and throw you off balance.

For roof, ladder or scaffold work, remember this: "There's no safer saw than a Speedmatic!"



MODEL K-89
8" blade—2¼" cut.
Three other sizes:
7½", 10¼", 12"

Speedmatic

PORTER-CABLE
SAWS

TRY A SPEEDMATIC Examine one at your dealer or supply house. Lift it. Notice how it assumes a balanced, ready-to-cut position. Press the trigger. Notice how it starts without torque, twist or jerk. That's true balance! Buy it—and enjoy safer, easier sawing from that day on.

PORTER-CABLE Machine Co., 5049 N. Salina St., Syracuse 8, N.Y.
In Canada write: Strangridge, Ltd., St. Catharines, Ont.

Manufacturers of SPEEDMATIC and GUILD Electric Tools
The Balanced Line

New 22-Ton Trucks Are Spring-Mounted

Two new rear-dump models have been announced by The Euclid Road Machinery Co., 1361 Chardon Road, Cleveland 17, Ohio. Both have a 22-ton capacity with spring-mounted drive axle.

The Model 45TD is powered by a 285-hp Buda engine. The Model 46TD has a 300-hp Cummins engine. Both have a 10-speed transmission and are available with standard or quarry body. A heated body which speeds dumping operations during cold weather is available as optional equipment. Top speed with full payload is 32 mph, the company says.

The Euclid double-reduction planetary-type drive axle is mounted on free-floating springs and is positioned to the frame by swivel-connected rods. This mounting is said to permit movement of the springs in the spring brackets and avoid the leaf breakage caused by twisting on rough haul roads. The



Two new Euclid rear-dumps are on the market—Model 45TD with a 285-hp Buda diesel engine, and Model 46TD with a 300-hp Cummins diesel. Both have a spring-mounted drive axle. Payload capacity is 44,000 pounds.

Euclid spring suspension provides for varying the spring contact centers according to the load — a long flexible

spring for an empty unit and a short rigid spring for heavy loads. This is designed to give a smooth, comfortable ride and permit faster travel speeds on the loaded and return haul. Other features include an air assist clutch, hydraulic-booster steering, and adjustable driver's seat.

A 16-page catalog illustrates these new rear-dump Euclid models and contains specifications of the engine, transmission, drive axle, frame, body, etc. It may be obtained from the company by requesting Form No. 121, or by using the Request Card at page 16. Circle No. 592.

Caterpillar Promotes Nine

There have been several staff changes at Caterpillar Tractor Co.,

Peoria, Ill. Leonard J. Fletcher is now a vice president of the company. Ralph J. Morgan is Executive Assistant to the President. Clyde L. Schwyhart is Manager of the newly named Education and Training Department. And Fred R. Jolly is Manager of the Community Relations Department.

In the General Sales Department, C. E. Jones is Parts Manager in charge of planning and development work for the Parts Department; George P. Fenn is Manager of the Sales Development Division; and Robert D. Evans is Assistant Manager of the division.

There have been two changes in the Central Sales Division. John M. Abbey has been transferred to the Industrial Division as Assistant Sales Manager. N. F. Sattlem replaces him as Assistant Sales Manager of the Central Division.

Advice on Lubrication

A cooperative technical service to users of petroleum products is explained by Gulf Oil Corp., Gulf Bldg., Pittsburgh 30, Pa., in the booklet "Gulf Periodic Consultation Service".

It points out that the proper application of petroleum products to individual problems involves highly specialized knowledge and experience, and that often many unrelated problems are encountered. The average company can seldom develop within its own organization the necessary knowledge and experience. For this reason, Gulf makes available the regular counsel of experienced engineers through its periodic consultation service. The booklet describes the benefits to be derived from this service.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 577.

*The only COMPLETE Line...
there's a model to solve
YOUR problems!*



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QUICK COUPLERS For All Hydraulic Lines!

ULRIX NO ONE COUPLER CAN DO ALL JOBS! To meet your every hydraulic requirement, Ulrich alone has a full line—14 different models and sizes to solve any problem you may have.

ULRIX SUPREME IN THE FIELD, ULRIX Break-A-Way Couplers are the finest ever built. They break and seal both ends of the line ON IMPACT... prevent loss of oil and damage to hose. The ULRIX ball check valve is the most practical seal for hydraulic fluid ever developed.

ULRIX COMPLETELY DIRT-SEALED so that dirt or dust cannot come in contact with any working parts of the coupler. Where torque is a problem, completely sealed built-in swivels permit the hose to turn under pressure.

ULRIX THOUSANDS IN USE, ULRIX Quick Couplers are adapted to a wide range of hydraulic applications.



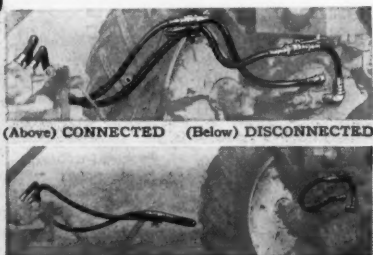
Typical installation is shown at right. Note that couplers are hooked up so that plugs and sockets are in reverse. Thus, when disconnected they are protected against dirt. By following this procedure, you seal both the coupler and the lines from dirt, connected or disconnected; also prevent dangling ends.

The ULRIX distributor is "COUPLER HEADQUARTERS" because with a full line, he has the coupler best fitted for any job.



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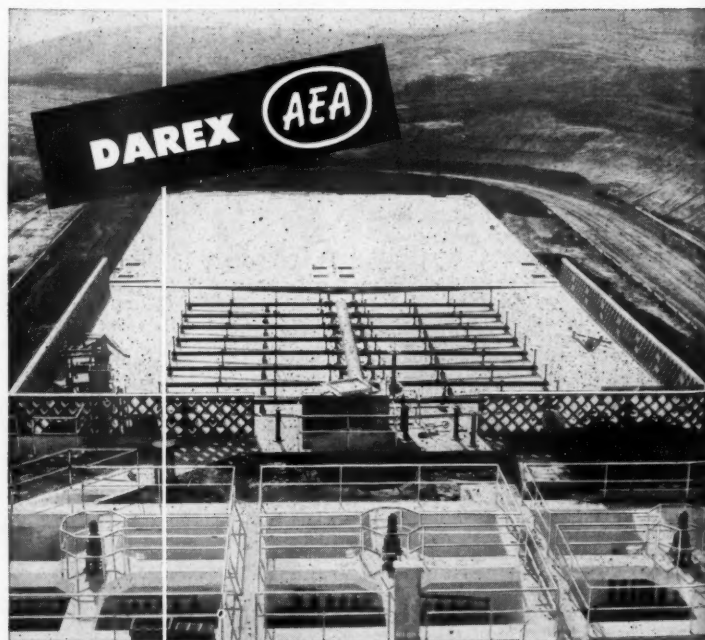
ULRICH MANUFACTURING CO., ROANOKE, ILL.



(Above) CONNECTED (Below) DISCONNECTED

CONNECT UNDER PRESSURE WITHOUT TOOLS. A twist of the wrist locks ULRIX Quick Couplers into place automatically.

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Air-entrained concrete, made with Darex AEA, was used for this new Water Treatment Plant at Antioch, California.

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On job after job these facts have been proved: Darex AEA concrete places easier and faster, finishes better, has better surface texture, is more homogeneous, thus more watertight.

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Maintenance Methods Detailed at Meeting

Missouri Inaugurates Visual-Audio Seminar; Response Drawn From Field Personnel Is Enthusiastic

• THREE years ago, engineers of the Missouri State Highway Department had an idea that detailed movies of maintenance methods in the 10 divisions might offer valuable comparisons and increase efficiency. That idea has now grown and developed into a full-fledged seminar on maintenance practice, and employees of the Highway Department's Bureau of Maintenance are receiving the information enthusiastically.

What started with a movie camera now includes running comment and a lecture by R. M. Whitton*, Engineer of Maintenance. Employee and public relations and general efficiency, now occupy a position of equal eminence with technical skill in maintenance practice.

The movies, which show in detail all typical and unusual maintenance operations in every division, were taken by former Staff Photographer Walter Pohl and by O. I. Steele, Assistant Engineer of Maintenance. The first films have now been rounded out by various missing links which showed up, until now they give a broad, complete picture of highway maintenance work in Missouri. With Whitton's lecture, they were being given in every division this past summer.

Typical of the usual program was a meeting of all regular key maintenance men in Division 5, held the evening of May 29 at Adcock's Cafe in Jefferson City. About 150 men attended.

Lecture Opens Meeting

Whitton opened his lecture, after being introduced by Division Engineer V. B. Saville, by declaring that the ability to work with other people is even more important than the technical skill represented by the pictures to follow.

"Some surveys rate that factor as high as 88 points out of 100", Whitton told the group. "A maintenance man needs that quality to a remarkable degree", he continued, "because he has to work with his crew, his boss, and the public."

Whitton then went into detail with advice for maintenance foremen especially. One of the first duties of a maintenance foreman is to build morale among the men, and one way to do it is to show that he holds the department in high esteem. It is often necessary to do unpleasant tasks—and Whitton, who is utterly practical, cited the burying of a dead sheep in the progressive stage of decomposition as an example — but when unpleasant things are done cheerfully, they are not so difficult. When morale is poor, every task is tough, Whitton said.

A second important responsibility of a foreman is the training and instruction of new employees. New men just entering the department are children, so far as familiarity with the work is concerned, and they require the same care and attention children would require in an unfamiliar situation. A foreman should never allow a new man to struggle along, hit or miss. He should give him instruction, should check back often to see that the new man is starting in right, and should point out errors in a civil, understanding, neutral way.

Recognition of ability, Whitton said, is one of the most important single things a foreman should learn. Men respond to a leader who gives credit where credit is due.

* On July 23, Whitton succeeded Carl W. Brown as Chief Engineer of the Missouri Highway Department.

The days have long since passed when the foreman or supervisor did all the thinking and men were kept in the dark about plans to come, Whitton said, as he urged foremen to plan work with their men, to make the men feel themselves a part of the plan, and

to outline reasons for work ahead. Men in the field have most of the good ideas for increasing efficiency, he said, and the encouragement of these ideas and

their expression is very important. A foreman should handle grievances fairly and play no favorites, Whitton (Continued on next page)

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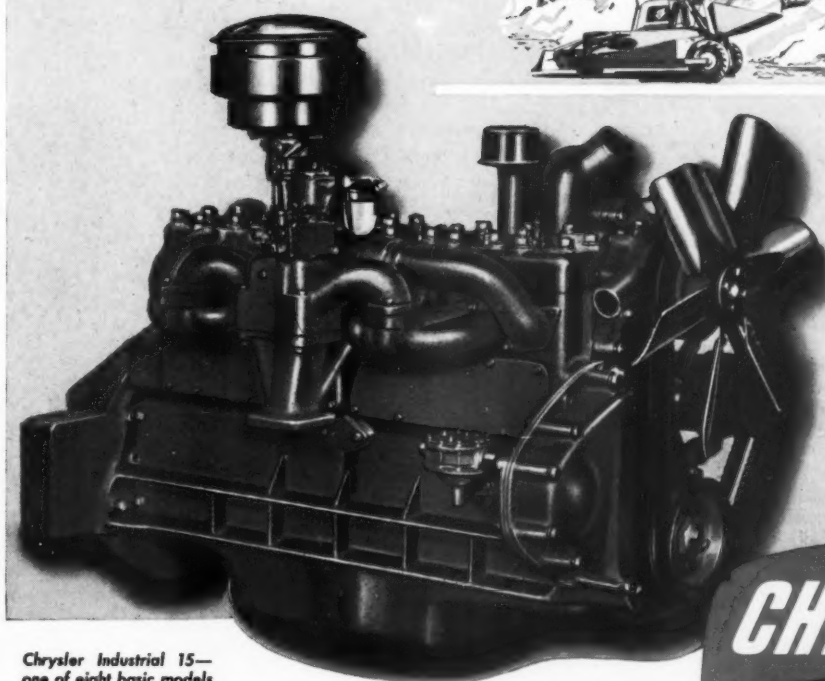
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• Tractors • Arc Welders •
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• Tackle Blocks • Winches



In Farming, Chrysler Powers
Tractors • Combines • Gang
Mowers • Spreaders • Irrigation
Equipment • Orchard Sprayers •
Hay Choppers • Pumps • Feed
Mills • Sprinklers



In Other Fields, Chrysler Powers
Locomotives • Motor Coaches •
Air Conditioning Equipment • Pulp
Machines • Drilling Equipment •
Fire Pumps • Snow Plows • Street
Flushers • Saw Mill Equipment •
Oil Well Pumps and Drillers



Chrysler Industrial 15—
one of eight basic models

More manufacturers, more operators of industrial equipment are discovering the brilliant efficiency of Chrysler Industrial Engines on scores of different applications.

For Chrysler Industrial Engines are built solely for industrial jobs. Furthermore, Chrysler Industrial Engines are designed and engineered to meet the specific working

requirements of each type of equipment they power. They can also be adapted to special regional operating conditions.

A letter of inquiry will bring an engineer well qualified to discuss your particular application. Address: Industrial Engine Division, Chrysler Corporation, Detroit, 31, Michigan.



Maintenance Methods Detailed at Meeting

(Continued from preceding page)

continued. Giving a favorite employee more time than another is bound to breed gang contempt for the foreman. Safety consciousness and good house-keeping also came in for emphasis, as did the management of time, tools, and relations with the public.

Hits "Status Quo" Idea

Hitting the status quo idea, Whitton said flatly that the foreman who resists change is showing the first signs of old age, and charged that such men were in a rut, however comfortable it might appear to be. He encouraged everyone to ask frequently "How can we do this differently and better?"

Plain, ordinary courtesy prevents friction in any organization, Whitton explained, as he compared courtesy to lubricating oil to relieve the squeaks of friction. Courtesy in a maintenance organization includes the patience to listen to explanations, and the explanation in advance of proposed changes in personnel or practice. Simple introductions are important when new men come on the job, he said. "When you don't introduce men, the new man feels like a number at the county jail", he explained.

Grateful letters often come in to Chief Engineer Carl W. Brown and the Highway Commission from people the maintenance men have helped, and Whitton read such a letter to the group. Concluding, Whitton stressed the importance of helping each man develop to his fullest potential.

"It will supply the valuable men the Missouri Highway Department needs now and in the future, as our roads get older and our job becomes tougher and more important", he said.

Movies Shown

Movies, the second part of the program, included scenes of maintenance work both by the state's forces and by contract. Road-mix upper-decking, spot patching of concrete and bituminous highways, filling joints, mowing, patching concrete with crushed limestone, removing concrete curbs, sealing with various asphalts including emulsion, asphalt undersealing, concrete replacement, hedge trimming with a power mower, and construction of new maintenance sheds by tilt-up concrete methods were shown.

Stressing the safety angle, Whitton and Steele both urged all equipment operators to fly red flags in prominent places on the machines. Flagmen now use a special device modified from warning paddles used by road builders in Argentina, and suggested to Whitton by Col. Hitch of Kemper Military Academy at Boonville, Mo. One side of the round semaphore is painted red with the word stop. The other side is orange or yellow, with the word slow. The semaphores have increased flagmen's efficiency in handling traffic, and reduced danger to crews.

According to the movies, the use of SC-4 asphalt in bituminous road-mix upper-decking has given excellent results. One recent 12-mile job was all mixed before it was laid. Running comment during the showing of this operation included advice that too much tack coat ahead of road-mix laydown makes SC asphalts bleed badly, that it is always wise to put the asphalt in the windrow in about three shots, that Seaman Pulvi-Mixers help motor graders enormously, and that motor graders without cabs afford better visibility and are much cooler in summer.

Last fall a bituminous road-mix upper-deck was laid on U. S. 66 in Webster County. A bad freeze-and-thaw winter, coupled with extremely heavy traffic, produced a first-class failure of the entire section . . . and

there might have been insufficient curing and aeration also.

At any rate, the maintenance superintendent charged with tearing up and wasting the failed mat believed he could remix and restore it to duty. He got permission to try. The mat was scarified, pulverized with rollers and other equipment, and re-laid without adding any asphalt. The mat is now giving excellent service, and its reclamation was shown in the pictures.

An unusually efficient mixing board was shown, where the aggregate was placed on one side, the asphalt and mixing done in the center, and storage of material made on the other side. The scheme could be followed in either a straight or circular pattern.

Movies of concrete-pavement patch-

ing produced the interesting theory that an asphalt underseal might actually help a concrete highway stand up under frequent heavy axle loads. On one job near Kansas City an RPB Mighty Midget breaker was brought in, and, according to the maintenance foreman, it reduced his concrete-breaking costs by 50 cents per square yard. But when they put the Midget on a section which had been undersealed with asphalt, its performance dropped off, leading engineers to believe there may be some intangible loading value in the asphalt in addition to its value as an undersealing agent.

High-efficiency concrete plants were shown in connection with this patching work. One particularly good concrete plant had a small Johnson batcher, with

bin-charging by an ID-9-mounted Hough front-end loader. The Hough loader also loaded broken concrete, but Whitton showed how the broken concrete lying around over the pavement nearby was a traffic hazard and an impediment to concrete and finishing crews. The practice of loading the broken concrete to trucks as fast as it is broken out is general in nine divisions, and the tenth division is now beginning to see how wise that is.

Not all practices shown were good. One gang, in shirt sleeves, was applying smoking asphalt. "Now look at those men in shirt sleeves, and you can see the asphalt's too hot", Whitton interjected.

One of the interesting maintenance (Concluded on next page)

AGGREGATE

14,472 TONS!

The Peak Day's Production at Concrete Materials & Construction Co. —Average Daily Production 600 TONS PER HOUR!

THIS CEDARAPIDS DOUBLE IMPELLER IMPACT BREAKER is really turning out the tonnage! On their New Jersey Turnpike contract, Concrete Materials & Construction Co. put through 14,472 tons of aggregate . . . 800 truck loads, at 16 to 20 tons per load . . . on their peak day, a 20-hour period when the surge pile was down and plenty of trucks were available for feed. *That's a 724 ton per hour peak production average!*

Originally scheduled to turn out around 400 tons per hour, the 5050 Double Impeller Impact Breaker in this Concrete Materials plant is consistently averaging more than 600 tons per hour. No wonder more and more contractors are depending on the bonus production of Cedarapids Double Impellers!

To meet today's demand for **AGGREGATE UNLIMITED**, and assure yourself of *opportunity unlimited* for profit, see your Cedarapids distributor today for the equipment you need to make your plant a real producer.



DOUBLE IMPELLER IMPACT BREAKERS

Get ready for the *big* jobs with a Cedarapids Double Impeller Impact Breaker in your plant. It's your assurance of maximum output of the cubical shaped aggregate required in so many specifications today. Because so much of the material is broken in suspension, you get an extremely high ratio of reduction at extremely low power costs. Exceptional tonnage with a minimum of connected horsepower! And you save on your plant set-up because you can eliminate much accessory equipment such as secondary crushers, conveyors, etc. You can get *immediate delivery* on Double Impeller Impact Breakers to give you **OPPORTUNITY UNLIMITED** right now! Four sizes available.

THE IOWA LINE

of Material Handling Equipment Includes: ROCK AND GRAVEL CRUSHERS • BELT CONVEYORS • STEEL BINS • VIBRATOR AND REVOLVING SCREENS • UNITIZED ROCK AND GRAVEL PLANTS • FEEDERS • PORTABLE POWER CONVEYORS • PORTABLE AND STATIONARY STONE, GRAVEL AND SAND PLANTS • REDUCTION CRUSHERS • BATCH TYPE AND VOLUMETRIC TYPE ASPHALT PLANTS • DRIERS • DUST COLLECTORS • HAMMERMILLS • WASHING PLANTS • VIBRATING SOIL COMPACTION UNITS • DOUBLE IMPELLER IMPACT BREAKERS

applications was a picture of a power mower trimming a large roadside hedge near Kansas City. Working from ground level first, the machine made the side cuts. Then they mounted the mower on a small flat-bed trailer, and towed it along with its blade about 3 feet off the ground. The mower made a flat cut across the top of the hedge.

The work by contractors came in for praise, too. A recent efficient practice is for contractors to furnish pugmill-mixed bituminous deck material from commercial plants. As they deliver it to the job, maintenance crews and equipment do the spreading. One recent job used about 800 tons a day by this method.

Details of a tilt-up concrete-slab building in California, Mo., were shown

through the construction stages. Measuring 74 x 32 feet, it will have 4 equipment bays and be used by the Maintenance Department. Showing the movies gave maintenance men in other divisions a chance to see how the new-type construction goes in.

Whitton plans to elaborate on the movie films in the future, as better practices are developed, and to continue with his employee-training lectures to maintenance personnel. The program is being received enthusiastically by every man who has heard the lecture and seen the pictures.

Marion Executive V. P.

John P. Courtright has been appointed Executive Vice President of

Marion Power Shovel Co., Marion, Ohio. He became associated with the company in 1927, and for several years has served as Vice President in Charge of Sales and Service. He continues in this capacity in his new position.

Folder on Lubricants

A circular describing D-A lubricants for heavy-duty equipment has been prepared by D-A Lubricant Co., Inc., 1311 W. 29th St., Indianapolis 8, Ind. It outlines the properties and features of the lubricants for various construction services.

This literature may be obtained from the company, or by using the Request Card bound in at page 16. Circle No. 608.

Cold-Straightening Of Heavy Steel Beams

An article that appeared some time ago in *The Welding Journal* discussed the possibility of straightening steel beams—bent by accident or failure—by cold-working (peening) the convex side of the beam instead of heating it. The information reported by the authors of the article, H. L. Harrison and B. D. Mills, Jr., is worth repeating in part because of its interest to both contractors and engineers.

When a steel beam in a bridge or other structure has been bent by an accident, it is sometimes practical to straighten the member in position, instead of replacing it. The straightening is usually accomplished by applying heat to a small area of the beam, near the bend. This causes the metal to expand and yield locally. Then, upon cooling, the beam contracts into a straightened position. In some instances, however, it is found necessary to supplement the heat-and-contraction technique with a certain amount of cold-straightening.

In cold-straightening, a large transverse force is applied to the side of the beam by means of a jack or a cable. This force must cause bending stresses higher than the yield point of the steel, to accomplish permanent straightening. If, however, the tension side of the bent member is lightly hammered during application of the force, straightening can be effected under a steady force which would alone be insufficient to produce yielding. This observed behavior has led to laboratory studies of the effect of light hammering on members carrying steady axial tension. The investigation is related also to the peening of welds for the relief of residual stress.

The investigation is under the sponsorship of the Engineering Experiment Station of the University of Washington. To date, the work is only of an exploratory nature, using a simple type of specimen under steady tensile stress. The experimental results do not warrant any sweeping conclusions. But they do indicate that a considerable plastic elongation can result from light transverse hammering on a tension member whose steady stress is well below the yield point.

This exploratory investigation has also indicated a number of interesting features of the behavior of constant-stress members under light transverse hammering. Even when the steady stress was less than half the yield point, a few hundred light blows of a flat-faced hammer caused appreciable plastic elongation. Differences in room temperature and frequency of blows appeared to have a considerable effect. It was significant that the plastic elongation was confined almost entirely to the zone actually struck by the hammer. The conditions responsible for the plastic elongation have not been established, though. It is possible that the dynamic stresses during each hammer blow are sufficiently high so that momentary yielding occurs.

Poster on Safety Shoes

As a postscript to its extensive campaign for safety in the plant, D. W. Onan & Sons, Inc., University Ave., Minneapolis 14, Minn., is now offering a poster-size picture story on the importance of wearing safety shoes. Checking up on its own plant some time ago, the company found out that of a total of 513 men working in vulnerable areas, only 41 wore any kind of protective shoe. The effectiveness of its poster in reducing foot injuries led Onan to prepare additional copies for free distribution on request.

These posters may be obtained from the company, or by using the Request Card at page 16. Circle No. 600.

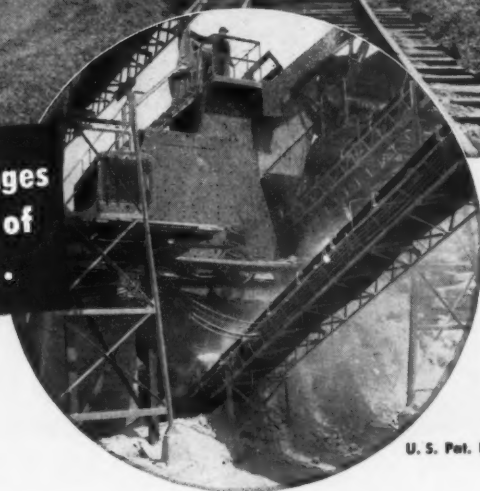
UNLIMITED

for the New Jersey Turnpike



BINKLEY BROS. PLANT averages 250 to 300 tons per hour of 3 1/2" minus material....

In the Bradford Hills Quarry near Downingtown, Pa., one 5050 Double Impeller Impact Breaker, owned by Binkley Bros., is taking quarry rock... material passing a 50" opening... reducing it to meet specifications for small sized cubical aggregate, and doing it in one pass at a rate of 250 to 300 tons per hour.



U. S. Pat. No. 2373691
2486421

IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa, U.S.A.

Recommended Mixes For Perlite Concrete

The Perlite Institute has just established a series of five recommended standard mixes for lightweight, insulating, perlite concrete. From the chart set up, contractors can determine exactly how much cement, perlite, water, and air-entraining agent is required for each cubic yard of placed concrete. Designers can determine in advance what the weight of the dry concrete will be and what its compressive strength will be. With this chart, all elements of the building industry have available data on the desired properties of any specific standard perlite-concrete mix.

Concrete will be employed more and more during the period of steel shortages. Careful designers, however, will take into account the fact that perlite concrete and sand-and-gravel concrete do not compete in the same field. Perlite concrete is not designed for compressive strengths of 2,000 to 4,000 psi required in footings, retaining walls, columns, bridges, etc. On the other hand, it is suited for roof and floor fill, radiant subfloor slabs, fireproofing, curtain walls, partition or well-masonry units, and roof decks on short spans.

Further information may be secured from the Institute at 35 W. 53rd Street, New York 19, N. Y. Or use the Request Card at page 16. Circle No. 674.

Drill Bit for Plug And Feather Work

A record averaging 13 seconds per hole for wet drilling of 3/4-inch holes 3 1/2-inches deep has been set by the new Thunderbolt bits, according to New England Carbide Tool Co., Inc., 60 Brookline St., Cambridge 39, Mass. The bits were tested for three years at the Rock of Ages quarry in Barre, Vt., using a Joy L27 self-rotating pneumatic hammer.

Specially designed for plug and feather work, Thunderbolt carbide-tipped plug drill bits are made of heat-treated alloy steel, hollow-drilled for water or air. They may be used for 75 to 100 holes before sharpening is necessary, the manufacturer says. Grinding instructions and a grinding template are supplied with the bits.

Further information may be secured direct from the company. Or use the Request Card at page 16. Circle No. 622.

Highway-Lab Apparatus

A suggested list of apparatus for laboratory tests on concrete and bituminous materials for highway and airport construction has been compiled by Central Scientific Co., 1700 Irving Park Road, Chicago 13, Ill. It includes apparatus for testing aggregates, moisture content, air content of concrete, specific gravity, liquid limit, plastic limit, penetration of bituminous materials, viscosity, ductility, etc. The list designates the quantity needed, the catalog number, and the price of each piece of equipment.

This literature may be obtained by requesting List No. 2001 from the company, or by using the Request Card at page 16. Circle No. 599.

Fram Corp. Promotions

The Fram Corp., Providence, R. I., has promoted several of its executives. Howard E. Robinson, formerly General Sales Manager, was elected Vice President in Charge of Sales. Milton M. Somers has been promoted from Sales Manager of the Automotive Jobber Division to General Sales Manager. Arthur F. Pettet was elected Vice President and General Manager of the company. He was formerly General Manager.

LIGHTWEIGHT INSULATION PERLITE CONCRETE: TYPICAL MIX DESIGNS

* DRY CONCRETE PROPERTIES			MIX PROPORTIONS BY VOLUME					MATERIALS REQUIRED FOR ONE CU. YARD OF PLACED CONCRETE			
Density (lbs/cu ft Oven Dry)	Com- pressive Strength (psi at 28 days)	Thermal Conduc- tivity "k"	Cement (Sacks)	Perlite (cu ft)	Water (Gal per Sack Cement)	Air Entrain- ing Agent ** (Pints)	Wet Density as Placed (lbs/cu ft)	Cement (Sacks)	Perlite (cu ft)	Water (Gals)	Air Entrain- ing Agent ** (Pints)
15	490	.93	1	4	9	1	49	6.50	26	58-1/2	6-1/2
29	280	.77	1	5	11	1-1/4	42-1/2	5.20	26	57	6-1/2
26	220	.70	1	6	13	1-1/2	40	4.33	26	56-1/2	6-1/2
21-1/2	160	.65	1	7	15	1-3/4	38	3.70	26	56	6-1/2
21-1/2	125	.62	1	8	17	2	37	3.25	26	55	6-1/2

* Based on average aggregate density of 8 cubic feet. Strength data based on ASTM Type 1 portland cement. For higher early strengths, use ASTM Type III portland cement.

** Available from Perlite Institute members.

Other desired properties of strength, insulation, and density may be obtained by varying the proportion of cement and the air entrainment, or by the addition of supplementary aggregates. For best results, use the following mixing procedure:

1. Put required amount of water and air-entraining agent in mixer.
2. Add portland cement and mix to uniform slurry—usually about 1/2 minute.
3. Add perlite aggregate and mix until desired workability is obtained—usually about 2 minutes.

For information on transit mix, consult your nearest perlite manufacturer.

Catalog on Wall Forms

A 34-page catalog on its system of wall-form construction is offered by Symons Clamp & Mfg. Co., 4251 Diversey Ave., Chicago 39, Ill. It describes all the latest improvements in the Symons forming system and illustrates how it works. It shows jobs where Symons forms have been used and gives blueprint illustrations and complete specifications. It tells the material and equipment necessary, time required, and cost figures on actual jobs. A free form layout of any job may be obtained by sending in plans and specifications.

This literature may be obtained from the company by requesting Catalog F-7, or by using the Request Card at page 16. Circle No. 583.

Big Red

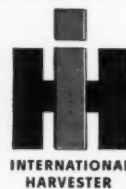
TD 24



ANOTHER BIG BITE is dumped by the shovel and Big Red goes into action, grading the dirt down the hillside to carve out a workbench for the shovel. Teamwork is essential when shovel and tractor work together. And you always want Big Red on your team.

INTERNATIONAL

POWER THAT PAYS



AGC and Producers' Council Form Cooperative Committee

The Associated General Contractors of America and The Producers' Council have established a national joint cooperative committee. It will provide a medium through which producers of building materials and general contractors can cooperate to increase the efficiency of the industry.

The committee will consider projects suggested by its own members, by members or chapters of either organization, by other groups in the industry, or by the public. Possibilities for discussion include material requirements for the defense program, standard forms of manufacturers' quotations, general terms of settlement with

subcontractors, escalator clauses, product exhibits, and local cooperation.

The committee expects to hold two meetings a year. The first is scheduled tentatively for the 25th of this month in Washington. Committee Co-chairmen are: for The Producers' Council, David S. Miller, The Kawneer Co., Niles, Mich.; for the AGC, W. Murray Werner, Werner Co., Shreveport, La.

Roadside Protection

The American Automobile Association has published a booklet called "Roadside Protection—A Study of the Problem and Suggested Approaches to Betterment".

It defines the roadside problem and outlines the objectives of a comprehensive

roadside program. It has chapters on administrative regulation, special easements, zoning, subdivision regulation, the designation and protection of future highway right-of-ways, expressways, and marginal-land acquisition. An appendix contains a bibliography, suggestions for legislation, and recommended standards for roadside business as well as the minimum standards recommended by the National Roadside Council.

Dr. David R. Levin of the Bureau of Public Roads prepared the material for the booklet under the guidance of the AAA Highway Committee and aided by its Advisory Council.

Copies may be obtained from the AAA, Pennsylvania Ave. at 17th St., Washington, D. C. Price: \$1.50.

Convention Calendar

October 5-6—Pan American Convention

First Pan American Convention of International Road Federation, Municipal Palace, Lima, Peru. International Road Federation, 550 Washington Bldg., Washington 5, D. C.

October 8-12—National Safety Congress

Thirty-ninth National Safety Congress and Exposition, Hotels Stevens, Palmer House, Congress, Morrison, and La Salle, Chicago, Ill. R. L. Forney, General Secretary, National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

October 8-13—CRSI Meeting

Semiannual Meeting, Concrete Reinforcing Steel Institute, Grove Park Inn, Asheville, N. C. H. C. Delzell, Managing Director, 38 S. Dearborn St., Chicago 3, Ill.

October 8-14—Pan American Road Congress

Fifth Pan American Highway Congress, Lima, Peru. International Road Federation, 550 Washington Bldg., Washington 5, D. C.

October 16-17—Virginia Road Conference

Annual Meeting, Virginia Highway Conference, Virginia Military Institute, Lexington, Va. R. P. Ellison, Executive Assistant, Virginia Department of Highways, 1221 E. Broad St., Richmond 19, Va.

October 22-25—ASCE Meeting

Fall Meeting, American Society of Civil Engineers, Hotel Statler, New York, N. Y. Don P. Reynolds, Assistant to the Secretary, 33 W. 39th St., New York 18, N. Y.

October 23-26—AASHO Meeting

Annual Meeting, American Association of State Highway Officials, Fontenelle Hotel, Omaha, Nebr. A. T. Lobell, Chairman, Committee on Reservations, Department of Roads and Irrigation, State House, Lincoln, Nebr.

October 30-31—Concrete Institute Meeting

Regional Meeting, American Concrete Institute, Sheraton Hotel, St. Louis, Mo. General Chairman, A. C. Weber, Director of Research in Sales Engineering, Laclede Steel Co., St. Louis, Mo.

Jan. 8-10, 1952—National Constructors Meeting

Annual Meeting, National Constructors Association, Waldorf-Astoria Hotel, New York. J. F. Pritchard, President, 50 E. 41st St., New York 17, N. Y.

January 21-24, 1952—ARBA Meeting

Annual Meeting, American Road Builders' Association, Rice Hotel, Houston, Texas. Lt. Gen. Eugene Reybold, Executive Vice President, International Bldg., Washington 4, D. C.

Jan. 27-31, 1952—AED Meeting

Annual Meeting, Associated Equipment Distributors, Stevens Hotel, Chicago, Ill. P. D. Hermann, Executive Secretary, 360 N. Michigan Ave., Chicago 1, Ill.

Feb. 10-14, 1952—National Sand & Gravel

and National Ready Mixed Concrete Assn. Annual Conventions, National Sand & Gravel Association and National Ready Mixed Concrete Association, Stevens Hotel, Chicago, Ill. V. F. Ahearn, Executive Secretary, 1325 E St., N. W., Washington 4, D. C.

Bulletin Covers Crushing, Screening, and Washing Units

A 4-page bulletin on aggregate-crushing, screening, and washing equipment is available from Diamond Iron Works, Inc., 18th Ave., N., and 2nd St., Minneapolis 11, Minn. Bulletin SMD-1 covers basic production units as well as portable and stationary crushing plants and portable primary crushing plants in the Diamond line. Descriptions and illustrations are included. A business reply card is enclosed in each bulletin for requesting more information on specific units.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 605.

Ryder New Sales Manager

The United Manufacturing Co., of Bedford, Ohio, has appointed Joseph N. Ryder to the post of Sales Manager.

In his new capacity Mr. Ryder, who already has much experience in the sales field, will supervise the sale and distribution of all the products made by United. These range from the Caravan line of 2 and 4-wheel axles to provide portability for compressors, pumps, welding generators, etc., to trailer axles, surge-control braking units, and accessory equipment.

Takes a Big Bite!

How International's Big Red Champ...the TD-24... Tackles 40 Feet of Solid Earth and Rock

Bring on your big tough jobs! Mass up the earth and rock. Then pass the word for "Big Red"—International's Champion of crawlers.

In the heart of the West Virginia mountains, Joe Troitino is stripping more than forty feet of earth and rock overburden to bare a rich four-foot seam of coal.

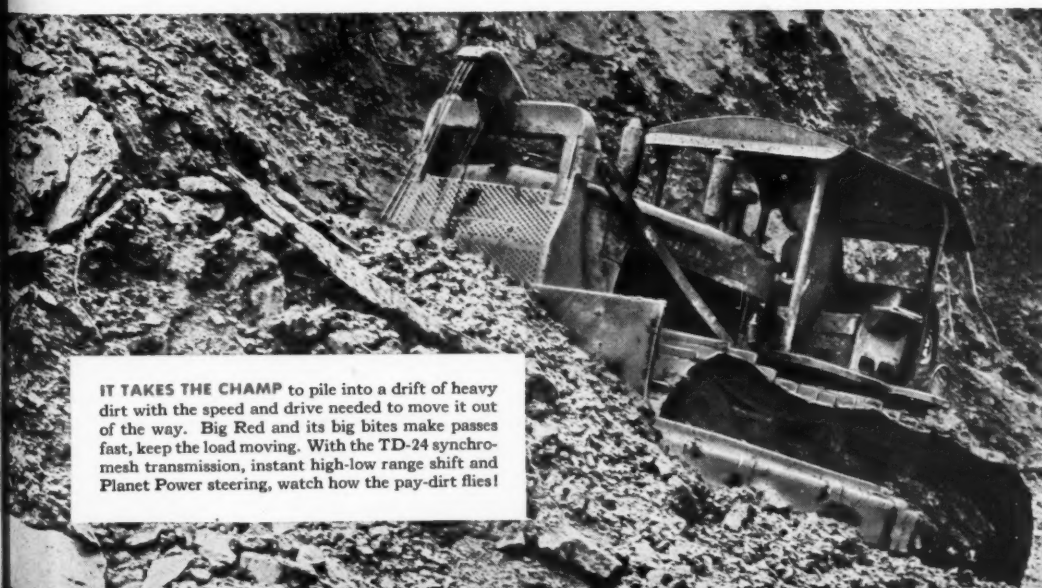
With the Big Red Champ on the job, Troitino strips about 450 tons of coal a day, and it's only one of his three coal stripping jobs!

"My company now owns six International TD-24s," says Troitino. "We think it is the best tractor on the market—and we have used all sorts of them under all kinds of conditions!

"Of course, I like the International TD-24 because it is easy to run, but, above everything else, we like it because it is more economical to operate than any other tractor we have ever used and because there is no rock or earthmoving job too tough for it."

The word is out. On the more rugged jobs, contractors who know crawlers are telling each other about the power and smooth action of the Big Red TD-24. Get the real low-down from your International Industrial Distributor. Ask him to show you Big Red in action—you'll be a TD-24 man from then on in!

International Harvester Company, Chicago 1, Illinois



IT TAKES THE CHAMP to pile into a drift of heavy dirt with the speed and drive needed to move it out of the way. Big Red and its big bites make passes fast, keep the load moving. With the TD-24 synchromesh transmission, instant high-low range shift and Planet Power steering, watch how the pay-dirt flies!



Modern Airco Plant Built in Union, N. J.

A new plant with a total floor area of 270,000 square feet is being built in Union, N. J., for the Airco Manufacturing Division of Air Reduction Co. Replacing the company's present plant in Jersey City, the new one is designed for streamlined production of oxyacetylene welding, hard-facing, and flame-cleaning equipment.

D. O. Evans of Hillside, N. J., is the contractor on the job and collaborated with Airco on the design of the plant. The plant and facilities, costing about \$2,000,000, will be owned by Evans and leased to Airco. The building has bays 40 feet in one direction and 50 feet in the other. The ground floor will cover an area 360 x 700 feet and be used for manufacturing. Offices will be entirely on the second floor in an area 40 x 450 feet. The plant will be finished in a buff-colored face brick backed with tile. Tile and plaster will be used for interior partitions. The 6 acres of roof will be of all-welded corrugated steel with a 1-inch Celotex insulation.



C. & E. M. Photo

Six acres of roofing will be welded to this steel frame for Airco's new manufacturing plant in Union, N. J. D. O. Evans of Hillside, N. J., is the general contractor.

Transportation: 1940-1950

"The U. S. Freight Carrying System, 1940 vs. 1950", a chart released by Dun & Bradstreet, Inc., shows the changes in carrying capacity and types of equipment for various carriers in the decade between 1940 and 1950. It points out that in 1950 the volume of traffic carried exceeded the 1940 level by about 44 per cent.

A trend toward a more intensive use of all means of transportation characterized this period—more trucks per mile of highway, more engine capacity

per mile of track, more barrel capacity per mile of pipeline. Air transportation gained nearly ten times as much freight carrying capacity with almost twice as many miles of established route. Total railroad track mileage has actually decreased as less profitable branch lines have been eliminated, although the total tractive capacity of the railroads has increased. In 1940 there were 4,540,000 trucks registered; in 1950 the number had risen to 8,198,500. During the same period surfaced highways increased from 1,340,000 miles to an estimated 1,617,000 miles.

Dun & Bradstreet estimates that national expenditures for all types of

transportation—passenger and freight—were \$47 billion in 1950, or one dollar out of every five of the national income.

Copies of this chart may be obtained from Dun & Bradstreet, Inc., 99 Church St., New York City.

Lift Gate for Trucks

A low-cost hydraulically operated lifting gate that eliminates the physical labor of lifting loads on or off a truck platform is the subject of an illustrated folder prepared by Hercules Steel Products Corp., Galion, Ohio.

The Load-N-Gate has sufficient capacity for practically every type of service, Hercules says. It is available in four sizes and is said to be easy to install. The platform may be "locked" at any desired height to facilitate loading or unloading.

This literature may be obtained from the company by requesting Bulletin No. 2151, or by using the Request Card bound in this issue at page 16. Circle No. 557.

GOODALL *Super Triple S* CONVEYOR BELTING



*Recommended for
Super-Severe Service*

Goodall "Super-Triple S" is built to handle the longest hauls and heaviest loads with unequalled efficiency and economy. Its reliable quality assures low ultimate cost through longer life and freedom from maintenance. The weather-resistant cover will withstand severest abrasive wear. Tensile strength, friction and other details determined by the specific service requirements.

The more than two miles of Goodall Conveyor Belting used in constructing the Detroit Dam is typical of the BIG jobs on which this carefully built belting demonstrates its outstanding quality and reliability. Contact our nearest branch for complete information and prices.



GOODALL RUBBER COMPANY

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.

Branches: Philadelphia • New York • Boston • Pittsburgh • Chicago • Detroit • St. Paul • Los Angeles
San Francisco • Seattle • Portland • Salt Lake City • Denver • Houston • Distributors in Other Principal Cities

Scottie "well oiled"
McBlock says, "I'll
stick to Scotch
Character Builder,
whatever the product,
it's canny to
buy the best."



It's canny to Buy McKISSICK

CONSTRUCTION BLOCKS

Built for . . .

- EXTRA HEAVY LOADS
- MED. OR HIGH SPEEDS

All steel construction . . . heavy steel plates and bars, steel sheaves and pins. Sheaves flame hardened, machine grooved to proper line size. Bronze bushings or roller bearings.



Write for catalog on this and other McKissick products

McKISSICK BUILDS A BETTER BLOCK FOR EVERY PURPOSE

McKISSICK

McKISSICK PRODUCTS CORPORATION
Box 2496 Tulsa, Oklahoma

\$2,500,000 Paving Job in Albuquerque

Mushrooming City Solves Unpaved-Street Problem: Calls In Contractors and Consulting Engineers

"ALBUQUERQUE is growing as fast as we can pave the streets."

That statement was made by a man who should know, because he is one of the contractors who is laying over 1,000 tons of hot-mix asphaltic concrete every day on the streets of New Mexico's largest city. Albuquerque's growth has been phenomenal. The population has doubled since 1940, and the mileage of paved streets has jumped from 84 in 1941 to 118.6 as of the end of 1950.

A \$2,500,000 worth of paving is cur-

rently contemplated. That is an approximate figure. Nobody really knows how much more it will run, or how much further the city will expand. Development after development is going up, and the streets have to be paved. Albuquerque is a windy city, and the desert on which it's built is dry and powdery. Unless streets are paved, the raw scars combined with traffic make the dust a headache for housewives.

Consultants Solve Problem

Even with Albuquerque's population,

it was impossible to finance such a major program out of current revenue. City officials solved the problem by financing in the same way paving in all New Mexico cities is paid for: by assessments against property along the streets. Simply stated, it means that the property owners voluntarily agree to an assessment against their property for the cost of the improvement work, and they have any time up to 10 years to pay it off.

It isn't hurting them too much. An average 32-foot residential-street improvement job costs \$3.05 a front foot for the asphaltic-concrete paving, and another \$1.45 a foot for curb and gutter work. Property owners along both sides of an alley usually split the cost, and the cost of paving street intersections is usually divided equally between the blocks.

Rather than to build up a tremendous city engineering organization to administer this work, Albuquerque chose private consulting engineers and

(Continued on next page)



Wonderful, isn't she! She's Amateur Inspector Lois McCleskey, sophomore at the University of New Mexico, from Los Alamos. She's checking the depth of asphaltic concrete in front of a home on Inspiration Drive. Apropos name, eh!

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\$2,500,000 Paving Job in Albuquerque

(Continued from preceding page)

private contractors. The consulting engineers make the detailed studies, draw up the assessments, and let the contracts, complete to supervising and testing the work. The contractors do the actual field paving.

Herkenhoff & Turney, consulting engineer of Santa Fe and Albuquerque, has been retained by the City. Contractors include Allison & Haney, Wiley Bros., and M. M. Paul.

Painstaking Work Precedes Paving

There is a long-drawn-out work process which must be gone through before paving can actually start. The process goes like this:

1. The city Commission selects a consulting engineer.
2. The consulting engineer then draws up a provisional order designating which streets should be improved. This order, after being prepared by the consulting engineer, is put out over the signature of the Commission.
3. The consulting engineer then prepares a maximum benefit list, which gives complete data regarding the description of the properties, names of owners, and the estimated cost for improving the property. This is an estimated maximum cost.
4. An assessment list covering the pro-rata share of assessment cost to each property owner is then submitted by the consulting engineer to the city Commission. The Commission advertises this list for three weeks in local newspaper media. Ten days after the advertising, a protest hearing is held to give property owners a chance to register their objections, if they have any. While the Commission has the power to go ahead with improvement work over the objection of citizens, it does not do so. If one-third of the property owners along a street object to the paving program, the entire street is deleted from paving plans.
5. A week after the protest meeting, the Commission determines what streets are to be paved, and passes a resolution asking the consulting engineer to draw up the plans.
6. A 30-day waiting period is then held to give property owners a chance to litigate injunctions, if any are so minded.
7. If no litigation is pending at the end of this 30-day period, the bids are called and contracts are let. As a rule, the work is let in large sections. One contract recently completed by Allison & Haney amounted to \$350,000.

Street Design

Herkenhoff & Turney has followed the same pavement design for most of the paving so far, and with the exception of minor modifications during the hottest summer months, the same specifications are expected to continue.

No granular subbase is required, because the streets of Albuquerque are set on a granular desert floor. The sandy gravel has good bearing value, especially when it is confined between a curb and gutter section on each side, and covered by pavement. The specifications require the base or subgrade to be compacted to fair densities, and the engineers are usually satisfied if modified AASHO tests show 90 or better.

The pavement consists of 3 inches of asphaltic-concrete base course with 1½-inch-maximum size aggregate, and about 5 to 6 per cent of 100-120 asphaltic cement. Over this base course is 1½ inches of leveling course, with ¾-inch-maximum aggregate, and 6 to 7 per cent of 85-to-100-penetration asphaltic cement.

Curbs and gutters are made of standard concrete, and drain inlets carry water away to underground storm



C. & E. M. Photo

A Huber 10-ton tandem roller compacts the base of Albuquerque's Lead Avenue. In the background is a Case-drawn Bros straight-wheel pneumatic-tire roller.

sewers. Much of the curb and gutter work, especially for Allison & Haney, has been done by Jaynes Construction Co. of Albuquerque.

We Visit a Paving Contract

How is the paving being laid? To

get the answer to that question, CONTRACTORS AND ENGINEERS MONTHLY visited the biggest and most active contract under way in May. Allison & Haney was doing the job, and things were well organized and moving along at a rapid rate. Daily production was

always over 1,000 tons in 8 hours, and several days the crews had barely missed their peak goal of 1,400 tons in a shift. They were paving from 6 to 7 residential blocks a day on a standard 32-foot street. Street width varies, incidentally, from 28 to 60 feet.

The paving crew was organized into three separate divisions. The first division took care of rough grading and compaction. A second crew made the finished grade, ready to receive asphaltic concrete. The paving crew completed the organizational picture.

For rough grading and shaping, Allison & Haney is using two No. 12 Caterpillar motor graders, a Haiss elevating loader and a Scoopmobile to pick up excess material, and a fleet of 7 rented dump trucks to haul it away. There is also a survey crew which sets stakes.

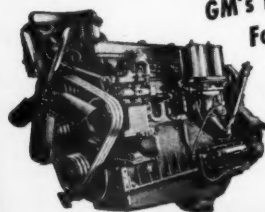
Fine-grading and compaction is handled by a No. 12 motor grader which fine-blades the grade to survey hubs, a sheepfoot roller, a Case-

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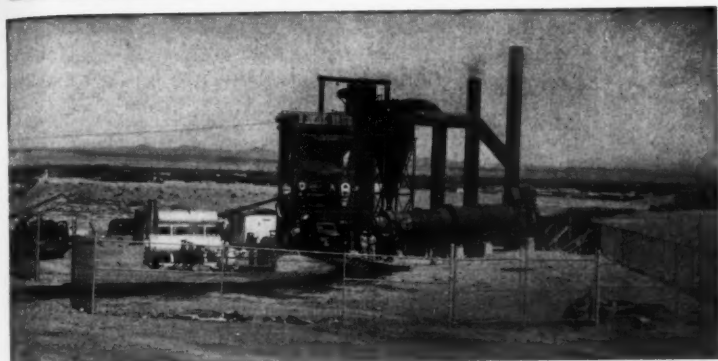
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C. & E. M. Photo

This Standard 5,000-pound hot-mix batch plant mixed the asphaltic concrete that Allison & Haney put on Albuquerque streets.



C. & E. M. Photo

On an Albuquerque street an Adnun Black Top Paver spreads hot-mix.

drawn Bros pneumatic-tire straight-wheel roller, and a Huber 10-ton 3-wheel steel roller. A 2,500-gallon water tank truck also hauls the water which is needed to obtain good densities. One of the contract provisions stipulates that the contractors are respon-

sible for the job for a period of one year. They are as interested as anybody, therefore, to get the base in right.

After the fine-grading crew finishes its work, the surface of the subgrade is tack-coated by a 1,200-gallon Etnyre distributor. The prime coat consists of

0.3 gallon of MC-1 asphalt. This prime coat is usually put down about 24 hours ahead of the laydown crew, and it is open to traffic after a light sand blot coat has been applied.

High-capacity asphalt laydown is possible because Allison & Haney is using two Adnun Black Top Pavers to spread the material. Eight batch trucks, rented from Bratton Griffin, haul 10-ton net loads to the machines. The width of the machines is varied to fit

the streets, and the laydown is made by conventional methods. The 3-inch-compacted base course is laid first, and the 1½-inch upper course tops it out.

The paving crew is extremely careful to swab the concrete gutter side with hot asphalt just ahead of the laydown machine. This makes a firm bond at that point, and prevents drainage water from soaking through during heavy rains.

Two Buffalo-Springfield 10-ton tandem rollers do the pavement compaction. They try to roll the asphalt until it develops about 95 to 96 per cent of the Marshall-test compactive value.

A New Hot Plant

Allison & Haney has recently purchased new a 5,000-pound Standard hot-mix plant to mix the asphaltic concrete. It is a clean, dust-free, trouble-free piece of machinery. The aggregate was produced some time ago under another contract, and the new plant is set up at the site of the aggregate storage pile, about 2½ miles from the present work. A D8 tractor and dozer feeds sand and aggregate to a feeder tunnel, which feeds the plant.

Heat is furnished by a Hy-Way hot-oil heater, and all asphalt lines are insulated heavily. There are four 12,000-gallon storage tanks at the plant—two for each grade of asphalt—and a motor-driven Viking asphalt pump keeps the hot asphalt circulating continuously to the hot pot on the plant.

Auxiliary plant equipment includes a 100-hp General Electric motor which drives the pugmill, a 50-hp G-E motor on the dust-collector fan, and a 50-hp G-E motor on the dryer.

The asphaltic cement comes by rail about 500 miles from the Coltex refinery at Colorado City, Texas. At the Albuquerque siding, the cars are heated by a Cleaver-Brooks tank-car heater, and the hot asphalt is then trucked out to the storage tanks. Low working temperatures are being maintained in the mix. Seldom does the 100-120 asphalt reach a temperature over 225 degrees in the mix, and the stiffer surface asphalt goes to about 260 degrees. Special care is also being taken not to overheat the aggregates.

Four of the 5,000-pound batches are hauled by each batch truck as it leaves the loading ramp underneath the plant pugmill.

Personnel

The City of Albuquerque is represented on the project by City Manager Charles E. Wells, and by City Engineer E. O. Betts. Gordon Herkenhoff heads engineering and supervision for the consulting-engineer firm.

For Allison & Haney, field operations are being directed under the personal supervision of A. J. Haney, member of the firm. Read Powell is General Superintendent, Tony Allen is Job Superintendent, and J. W. Crandall is in charge of grading and compaction.

The consulting-engineer and contractor arrangement is working beautifully, according to representatives from these two divisions, and those of the City of Albuquerque. The number of supervisory personnel is small, the personal contacts are on an exceedingly harmonious basis, and the paved streets are going in fast. And that is what counts

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The result is a master Diesel that saves fuel, prevents lugging and sludging at low speeds. But that's only part of the story.

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For next, GM engineers worked out a new timing cycle for exhaust valves in this engine—keeping the ports open for prolonged scavenging of burned gases from the cylinders.

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A new curing method for concrete products, based on the Vapor-Therm direct-firing unit, has been developed by R. D. Emmons, 303 Melrose Ave., Syracuse 6, N. Y. The process is said to permit a cyclical application of steam for maximum take-up of moisture.

The company reports that steam is delivered to the kiln within three minutes of the start of the boiler unit. The vapor is generated at low pressure and high temperatures. Fully automatic electric programming controls provide for individual time cycles on a selected group of 5 kilns. On-and-off operation permits admission of enough steam to envelop all of the blocks from the kiln without raising the temperature of any one of them too fast. The Vapor-Therm unit can also deliver high-temperature saturated steam for drying.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 569.

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This is the hydraulic Ray-Lind boom hoist to speed truck loading; the company also makes a mechanical model of this new piece of equipment.

Two New Boom Hoists Speed Truck Loading

Two new boom hoists, one mechanical and one hydraulic, have been designed by Ray-Lind Inc., Box 132, Iron River, Mich., to speed truck-loading operations. Both mount behind a truck cab and take about 18 inches of space. Both units have a 360-degree swing and may be used for loading one or more trucks.

The Model ML 25 mechanical loader has a cable clutch control which can be operated from any point. A positive ratchet brake holds the load in a desired position. The capacity of this unit is 4 tons at a 4-foot boom radius and 2 tons at an 8-foot radius. The mast, which may be extended about 10 feet from the truck frame, can be retracted for underpass clearance. Ray-Lind

points out that the winch on this unit is free-spooling and has an automatic brake so that the cable can be pulled out to full length and used for skidding timber to the truck. Power is supplied through the truck power take-off. If the truck happens to get caught in some bad ground, the boom can be swung over the truck cab and the cable secured to a tree.

The hydraulic model of the Ray-Lind Loader, HL 35, features a telescopic frame and mast—also a power-swinging telescoping boom. Power is obtained from the power take-off of the truck. This unit has a capacity of 6 tons at a 4-foot boom radius and 2 tons at a 12-foot radius.

Further information may be secured from the company. Or use the Request Card bound in at page 16. Circle No. 589.

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Low-Pressure Couplings

A folder illustrating and describing the low-pressure Wedge-Lock coupling has been issued by Naylor Pipe Co., 1230 E. 92nd St., Chicago 19, Ill. Designed for connecting lightweight pipe in ventilating and similar low-pressure service, this one-piece positive-type coupling is said to feature speed and simple installation. The folder includes complete specifications on pipe sizes from 8 to 30 inches in diameter.

This literature may be obtained from the company by requesting Bulletin No. 514, or by using the Request Card at page 16. Circle No. 585.

Burnett Directs Engineering

Clinton B. Burnett has been named Director of Engineering of Johns-Manville Corp., New York. Mr. Burnett, who is Vice President of Johns-Manville Products Corp., was formerly Production Manager of the company's Building Products Division.

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Portrait in Print

By BILL QUIRK

Still Handling the Hard Ones

• TWENTY years ago there was written in "Jambalaya"—Tulane University's yearbook—a singular tribute to the president of the student body. This tribute was conferred, according to the book, "because of his popularity with his fellow students, and because of the noble way he has handled the hardest of jobs." In retrospect, those college-day jobs must now seem picayune to Edward H. Gessner, Executive Vice President, Ewin Engineering Corp., Mobile, Ala., a construction firm that is currently engaged in projects totaling over \$16,000,000.

Since 1931 when he graduated from Tulane, Ed Gessner has been handling the hard ones not only in this country but in South America, Europe, and Asia as well. More than just a job was involved in Europe and Asia, where Gessner was seeing service with the Seabees. At 38 he became one of the youngest men in the U. S. Navy to reach the rank of captain.

Now edging up to 45, Gessner is still very much the young-man-in-a-hurry type, giving himself unsparingly to a vigorous direction of construction projects that embrace the highway, heavy, and building fields. Trimly built, Gessner stands 5 feet 9, weighing 165 pounds, and except for loss of hair on top and the addition of eyeglasses, looks pretty much like his picture in the Tulane yearbook when he was president of the student body. Still unchanged are the keen blue eyes, firm chin line, and the humorous twist to the lips of a naturally friendly person.

Engineering's Gain

Born in New Orleans, the son of a doctor, Gessner almost followed in his father's footsteps. He took a premedical course in college before he decided he would rather work with concrete and steel than the human body, and switched to civil engineering. The young student was also getting practical experience early in life, with jobs on construction projects during the summer vacations. In 1927 he dropped out of college for a while to work as engineer for F. Shutts & Sons, an engineering firm that was building a wharf at Lake Charles, La.

When the \$500,000 project was completed, Gessner returned to Tulane and completed his studies. After graduation he worked on another wharf project for Shutts, then took a position as job engineer and assistant superintendent for Doullut & Ewin, Inc., a firm established in 1925 and the parent company of the present Ewin Engineering Corp. His initial assignment was

the big bridge across the Atchafalaya River at Morgan City, La., where 600-foot steel trusses were being floated and raised to position 65 feet above the water—the biggest job of its type ever undertaken up to that time.

Two years later, following completion of the high span, Gessner built levees along the Mississippi, practically a must job for any Louisiana-born engineer. From levee building he turned to industrial construction, and worked on a chemical plant going up along the Louisiana Gulf Coast. This latter experience enabled him to accept a post of assistant superintendent in the mechanical service and construction



C. & E. M. Photo

Meet Ed Gessner, Executive Vice President of Ewin Engineering Corp., Mobile, Ala.

department of the Freeport Sulphur Co.

Gathered No Moss

Gessner was something of a rolling

stone in the depression-ridden 30's. "Those were the days", he reflected, "when as soon as a construction project

(Continued on next page)



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"The Hard Ones"— Gessner Likes Them

(Continued from preceding page)

was completed you were told you did a nice job, but that you had better start looking for another one right away." He moved from one construction firm to another, somehow managing to keep working. In 1935 he returned to Doullut & Ewin, Inc., as assistant superintendent on the construction of a terminal for Southern Kraft Paper Co. at Panama City, Fla.

Finding domestic construction still in the doldrums when that project was finished, Gessner left the U. S. A. for Venezuela and a post as general superintendent for the Martin Engineering Co. in the oil fields of Maracaibo. For three years he built road, railroads, residential and warehouse buildings, oil tanks, and allied construction, then switched to the Chicago Bridge & Iron Co. for more of the same as its representative in eastern Venezuela.



C. & E. M. Photo

"Big companies are coming down south", says Ed Gessner, "and they'll need new plants and facilities."

In the meantime, the rumblings of war had given a lift to the static construction industry at home, and in March, 1941, Gessner returned to the States and to his off-and-on-again employer, Doullut & Ewin. He became purchasing agent and office engineer on a \$20,000,000 project at the Alabama Dry Dock & Shipbuilding Corp. in Mobile for the U. S. Navy and Maritime Commission. The work included the construction of ways, shops, warehouses, railroad tracks, office buildings, and outfitting docks.

To See the World

Ed Gessner's status as a civilian was short-lived. The Navy needed men for the impending struggle, and in July, 1941, he joined up and was commissioned a lieutenant in the Civil Engineering Corps. His first assignment was as assistant officer in charge of construction at the U. S. Naval Air Station, Alameda, Calif. A break in Navy tradition thereby resulted. Heretofore, Navy officers assigned to construction

posts had nearly always been Annapolis men who had received engineering training at Rensselaer Polytechnic Institute, Troy, N. Y. High Navy technical brass blanched at the thought that a southerner, educated at Tulane University, and not R. P. I., was being put in a responsible construction post.

Well seasoned with a sound construction background and a wealth of varied experience, Gessner was not overawed. From the start he got along well with his immediate superior, Lieut. Joseph F. Jelley, now Rear Admiral, CEC, and Chief, Bureau of Yards and Docks, Navy Department. Gessner worked on the construction of the new base at Alameda until December, 1942, when he was ordered to Newfoundland with the Seabees. During 1943 he reached the rank of Commander, 64th Naval Construction Battalion, and by the end of the year had completed building a new base at Argentina, Newfoundland, that had been started by private contractors.

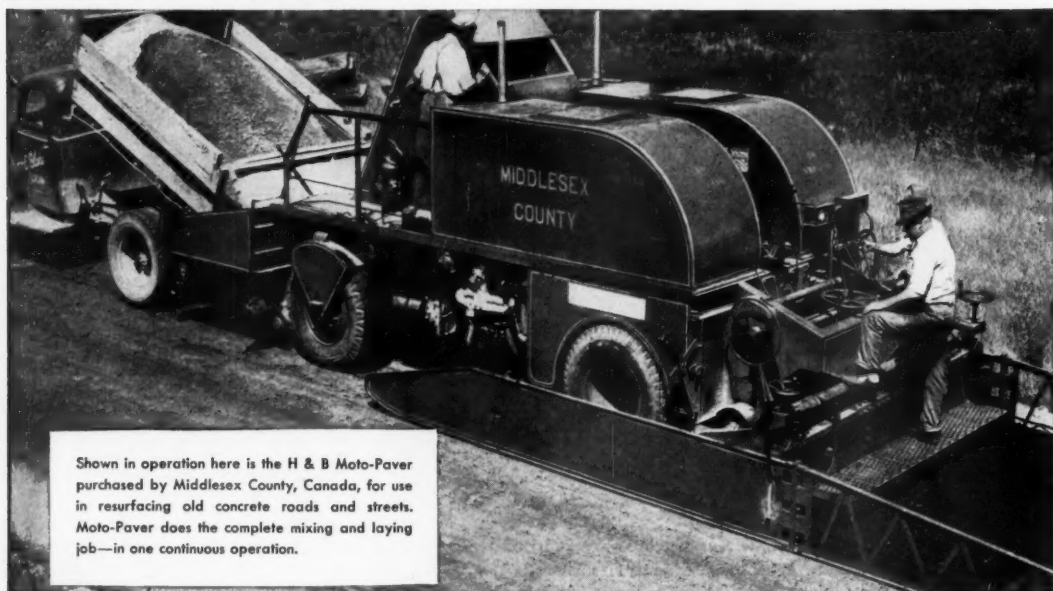
In January, 1944, the busy Seabee commander was called to Washington and told to head up the first Seabee POL unit (Petrol, Oil, and Lubricant) in preparation for the Normandy invasion. "We called gasoline petrol", Gessner explained, "and in return the British called their lorries trucks." Based at Plymouth, England, Gessner's 146th Battalion hit the beach at Normandy on that memorable June 6 invasion date. "We ran into heavy storms with 25-foot tides," Gessner recalled, "and the first truck going ashore dropped right out of sight in a hole in the beach."

Around the Globe

Gessner received the bronze star for his Normandy achievements, and his outfit was shipped home for a much-needed respite. He, however, was held in France, given a superbattalion of 2,000 men, and ordered to build an airport at Le Havre. With that completed, Washington called Gessner home in January, 1945, only to send him to Honolulu in command of the 44th Regiment with a complement of 7,000 men. His assignment this time was the Okinawa invasion.

Some 22 air strips were built on Okinawa by Gessner and his Seabees, and in July, 1945, the young naval officer was made a full captain—a rare ranking to a non-Annapolis man only 38 years old. In September, 1945, the

(Continued on next page)



Shown in operation here is the H & B Moto-Paver purchased by Middlesex County, Canada, for use in resurfacing old concrete roads and streets. Moto-Paver does the complete mixing and laying job—in one continuous operation.

Resurfacing costs cut approximately 50%



Showing aggregate being dumped directly from truck into front hopper of the Moto-Paver. Where it is necessary to use aggregate that has been windrowed on the road surface an H & B Moto-Loader, used in conjunction with the Moto-Paver, gives highly efficient results.

In these days of increasing costs, equipment that will save money is certainly worth investigating. Middlesex County, in Canada, investigated the Moto-Paver and decided to use it on their 1950 road resurfacing program. When the program was completed it was found that the costs were approximately 50% lower than they would have been if the work had been done by conventional methods.

We make no claims that Moto-Paver will save you 50% on your resurfacing costs. But we do say—based on Moto-Paver performance records under all kinds of conditions, that no other machine or method produces comparable results at comparable cost.

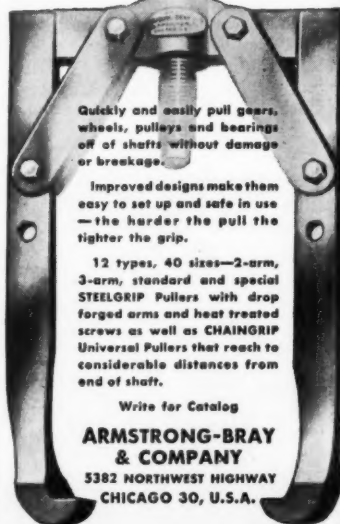
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war over, Captain Gessner returned to this country and was put on the inactive list. But the very next month he was recalled by Admiral Ben Morell, when the oil industry was taken over by the Government after a wave of strikes had shut down oil refineries throughout the country.

Gessner worked with Admiral Morell in the oil industry until February, 1946. At that time Macy's, New York's largest department store, was about to launch a postwar program of building expansion, and wanted a top-drawer engineer for the post of superintendent of maintenance and construction. Macy's asked Admiral Morell to suggest someone, and the Admiral recommended Gessner. Back in civvies again, after five years of Navy blues, the ex-Seabee built three new stores for Macy's in Brooklyn, Jamaica, and White Plains. Following that he went with Bloomingdale's, another big New York store, to operate its huge warehouse in Long Island City.

Return to the Southland

The latter position was the only non-construction job Gessner ever held, and he felt out of his element. He decided to return to the southland and start his own engineering and general contracting business. While on the west coast with the Navy, he met and married an attractive grass widow, Audrey Player McCann of San Francisco, who has two children—Joan McCann, 20, and William D. McCann, 18. After so much globe trotting, Gessner wanted to settle down with his family, and so opened up an office in New Orleans.

Within three months Gessner was doing work for big-name outfits like Standard Oil Co., and was retained as consultant by D. H. Holmes, large department store on Canal Street. Then in May, 1949, came an attractive offer, which Gessner accepted, to return to his old firm as executive vice president. Doullut & Ewin, Inc., dissolved at the end of the war, but the business continued as J. P. Ewin, Inc., until February, 1950, following the death of J. P. Ewin, when the firm became known as Ewin Engineering Corp., Civil Engineers and General Contractors. Headquarters are in a two-story building at 150 Savannah St., Mobile, Ala.

This well known organization of contractors, builders, and engineers offers well rounded, unified service from drawing board to finished job. By acting in the role of engineers as well as builders, by minimizing the need for liaison between separate organizations, it effects economies of time as well as money. The firm confines its activities to states along the Gulf Coast—Louisiana, Mississippi, Alabama, and Florida—and Puerto Rico. Ewin Engineering Corp. is a subsidiary of Southern Industries Corp., an Alabama holding company that operates, among others, the Oyster Shell Milling Corp., Radcliff Sand & Gravel Co., Inc., Richton Sand & Gravel Co., and Bay Towing & Dredging Co.

Impressive Record

A few of the larger dock projects in which the company has participated in either the design or construction include the marginal wharf expansion of the Alabama State Docks at Mobile; dock facilities for various clients at Tampa, Pensacola, Jacksonville, New Orleans, and San Juan, Puerto Rico; and dry docks for the U. S. Navy at Magazine Point, Mobile. Shipyards have been built at Mobile and Chickasaw, Ala., and Pascagoula, Miss.

In this heavy-construction classification are such well known stadiums as the Sugar Bowl, New Orleans; Ladd Memorial Stadium in Mobile; and the Municipal Stadium at Baton Rouge, La. Building work takes in such diversified structures as office buildings, hospitals, factories, shops, transit sheds, hotels,

and radio studios. The Ewin-built 16-story Waterman Building in Mobile is one of the most modern and best-looking office buildings in the south, or the country for that matter. Economic studies, surveys, plans for city improvements, highways, etc., are a routine part of company activities.

Current domestic work totals over \$16,000,000 with the expansion of Keesler Air Base, Biloxi, Miss., accounting for about half of this amount. Other projects include a department store and hospital in Mobile; concrete structures for Big Creek Dam, Mobile; two hospitals in Mississippi; a pier in Florida; and a highway bridge in Louisiana. Employees number around 2,000, and equipment includes both marine and land machinery.

Able Staff

Ewin Engineering Corp. is headed by one of the best known and most brilliant engineers in the south—65-year-old Truman A. Smith, a graduate of the University of Alabama where his

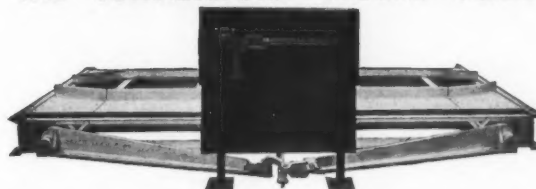
father, Dr. Eugene A. Smith, once state geologist, had been a science professor. Truman Smith, a civil-engineering graduate, also studied mining and me-

chanical engineering at the university. He has served with the U. S. Army Corps of Engineers, City of Mobile En-

(Concluded on next page)

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see for yourself. Valve-in-head engines that squeeze more power from every drop of gas. Self-energizing brakes for extra stopping power—greater safety. Wide-base wheels for increased tire mileage. These new Chevrolet trucks even offer extra driver comfort—with new cab seats and Ventipanes. But learn all the facts now. See the new Chevrolet Advance-Design trucks at your dealer's today.

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"The Hard Ones"— Gessner Likes Them

(Continued from preceding page)

gineering Department, and the Waterman Steamship Co. Smith went with the parent company in 1940, and was made vice president in 1945. He became president after the death of J. P. Ewin, and has been in that position ever since. He and Mrs. Smith, the former Pearl Boyles, who also attended the University of Alabama, make Mobile their home.

Between them, Truman Smith and Ed Gessner hold licenses to practice engineering in seven states and Puerto Rico. One complements the other—Smith, the sagacious planner, with Gessner executing and directing the details of construction. The energetic executive vice president foresees a continued program of expansion for the Deep South, which is currently in the midst of a social and economic revolution of significant proportions.

"Industry is becoming more and more aware of the favorable shipping and rail rates along the Gulf Coast," Gessner summed up, relaxing with a Coke. "Several big companies are coming down this way, which will require the construction of new plants and facilities. Naturally we hope to get some of that work."

And with the construction background of Ewin Engineering Corp., it would seem a safe bet that this experienced firm would be right up there building whatever is needed. If some of these projects prove a little on the difficult side, Ed Gessner will be around to handle them.

New Hydraulic Jack

The Simplex Rol-Toe, a 25-ton-capacity hydraulic jack, is announced by Templeton, Kenly & Co., 1020 S. Central Ave., Chicago 44, Ill. Its principal feature is that the lifting capacity of toe and cap are equal. The toe rides on a bearing roller that carries the radial head against a stationary ram's flat-milled surface. The lifting operation is said to be smooth and easy because the broad $4\frac{1}{2} \times 4\frac{1}{2}$ -inch toe always remains in an even position. The Model RTJ-25 has a 7-inch lift with minimum heights of $2\frac{1}{2}$ inches when lifting on the toe and 14 inches when lifting on the cap.

The manufacturer points out that the



Twenty-five-ton Rol-Toe hydraulic jacks set and level a Worthington gas engine on its foundations at the Los Angeles Sewage Disposal Plant.

sturdy integral construction of the head toe shortens off-center loading and brings the toe closer to the center of the ram. The jack is said to operate with equal efficiency in upright or horizontal positions. The oil reservoir is independent of the load-lifting housing to prevent pressure stress and oil leakage. The Simplex Rol-Toe has two separate pumps—a high-speed pump for positioning and lifting light loads and a high-pressure pump for heavy lifting. A safety by-pass valve is provided to guard against overloading.

Further information may be secured from the company by requesting Bulletin 51. Or use the Request Card at page 16. Circle No. 595.

Renner Advances at Lincoln

John E. Renner, who has been with Lincoln Engineering Co. for 15 years, has been appointed General Sales Manager of the company. Lincoln is a St. Louis manufacturer of lubrication equipment.

MIXERMOBILE MANUFACTURERS

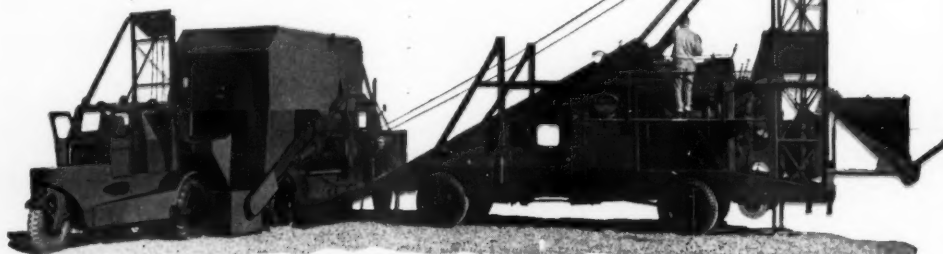
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Completely portable unit weigh batches aggregate on the job. Can be charged with front end loader from storage piles or directly from dump trucks. Single operator sets up unit for operation in 15 minutes. Weigh batches up to 50 cu. yds. per hour.

- Three 7 cu. yd. bins and 2 cu. yd. skip store up to 23 cu. yds. of aggregate.
- Charging skip hydraulically operated.
- Bin selector located by skip control directs skip.
- Equipped with either dial or beam scales.
- Weight, 17,800 lbs; height, 12 ft.; width, 8 ft.; overall length, 28 ft. (with skip down).
- Mounted all around on 8.25x20 tires.

2-YD. MIXERMOBILE • Model M-7

Completely mobile concrete mixing and elevating plant eliminates cost of hauling and erecting expensive equipment. One man handles the entire operation from mixer to deck.

- Improved batch-timer and counter insures positive mixing time.
- New electronic water meter gives unerring accuracy.
- Sturdy planetary drive hoist clutches give extra power, durability.
- Mixes up to 50 cu. yds. per hour.



SCOOPMOBILE • Model C. The versatile Scoopmobile with exclusive planetary drive has 7 "quick change" attachments. Standard $\frac{3}{4}$ -cu. yd. scoop bucket permits operator to keep Weigh Batcher unit performing to full capacity.

- Loads and transports aggregate.
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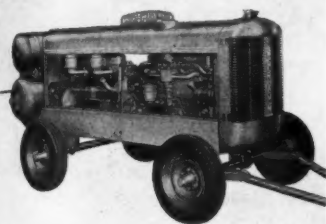
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The Schramm 210 Unistage compressor delivers 210 cubic feet of air a minute. Ninety per cent of the engine parts are interchangeable with the compressor parts. Pneumastat control is a feature.

A 210-CFM Compressor

The Model 210 Unistage compressor is a new addition to the line produced by Schramm, Inc., West Chester, Pa. With an actual air delivery of 210 cubic feet per minute, the 6-cylinder engine and 6-cylinder compressor unit is designed for continuous heavy-duty 24-hour service.

Ninety per cent of the engine parts are interchangeable with the compressor parts. This simplified design eliminates two-staging and intercoolers and requires fewer parts. The Pneumastat control is said to cut fuel costs up to 50 per cent. Electric starting, speed control, cam-operated mechanical intake valves, and dual fan belts are some of the other features.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 551.

Supercharged Engines

A line of improved supercharged engines has been introduced by Nordberg Mfg. Co., Chase and Oklahoma Aves., Milwaukee 7, Wis. The increased efficiency of the Supairthermal engine is based on a well known principle of thermodynamics—the lower the temperature of the air in the cylinder at the time the fuel is injected, the greater the amount of fuel that can be burned, and the higher the horsepower output without increasing peak temperatures or pressures.

The engines are available in a complete range of sizes from 425 to 3,200 bhp for stationary and marine applications. They are of the 4-cycle type and are built for operation on diesel fuel, Duafuel, and spark-fired gas. The engine's most notable characteristic, says Nordberg, is its ability, in any given size, to produce one-third more horsepower than the conventional supercharged engine with no greater heat to the cooling water and without increasing the internal surface temperatures or pressures.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 606.

Safety Storage Bins

A new line of safety storage bins designed as receptacles for paper, rags, paint, or other combustibles is available from Industrial Products Co., 2855 N. Fourth St., Philadelphia 33, Pa. Made of heavy-gage galvanized iron with reinforced angle-iron corners, these bins are fitted with a fusible link which allows the cover to close automatically in case of fire. The bins are available in three sizes, the largest being 24 inches wide, 58 inches long, and 37 inches high.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 681.

Calaveras Promotes London

Mel J. London has been promoted to the office of General Sales Manager for Calaveras Cement Co., San Francisco, Calif. He has been a member of the sales organization for the last six years.

Air-Entrainment Data

A leaflet on "What Air Entrainment Means to You", prepared by the Dumpcrete Division, Maxon Construction Co., Inc., 131 N. Ludlow St., Dayton 2, Ohio, gives the boiled-down facts on air entrainment in concrete. Additional information is given on the Dumpcrete nonagitating truck body.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 587.

Goodrich Expands in L. A.

About the first of November, five sales divisions of The B. F. Goodrich Co. will move into new Los Angeles headquarters at 2940 E. 44th St. The building will provide 8,000 square feet of office space and 45,420 square feet for warehousing. Some 13,320 square feet outside will be devoted to a truck dock and customer parking. The tilt-up method of concrete-wall construction was used on the building.



"Mr. Fruitly used to be a movie press agent."

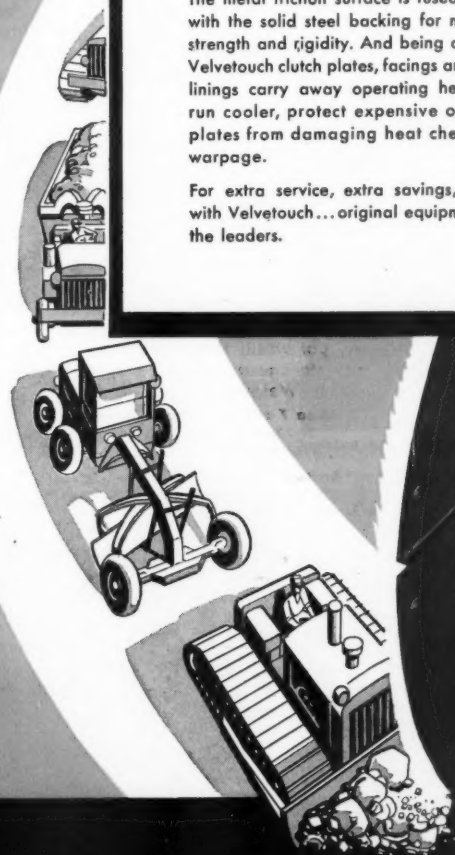
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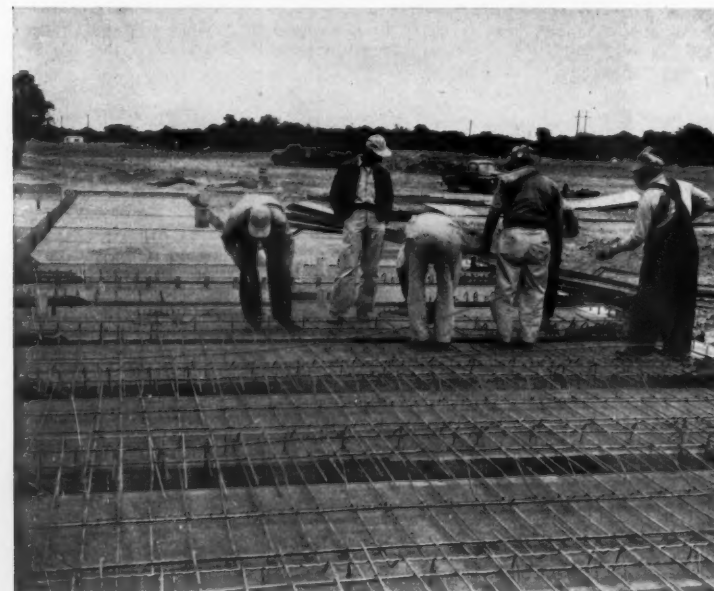
Manhattan Construction Co. set up an efficient small-output batching plant for its paper-mill contract: Binabatch weighing hopper, Schield Bantam truck crane for charging the hoppers, and two 16-S mixers—a Jaeger and a Gilson.



Scot-Crete buggies dumped concrete to Blaw-Knox buckets handled by a Lorain crane.



The Lorain crane swung the material over to the point of placement. Note the finished work in the foreground and the intricacy of the walls.



Ironworkers had quite a time; wall and slab reinforcing steel was very heavy.

National Gypsum Co. Builds a Paper Mill

Heavy Concrete Placing Necessary as Contractor Builds Modern Plant to Company Specifications

By RAYMOND P. DAY,
Western Editor

(Photo on page 1)

• IN eastern Oklahoma, 8½ miles south of Pryor, private capital is being invested by National Gypsum Co. of Buffalo, N. Y., in a business completely new to Oklahoma. Under a construction contract with the Muskogee, Okla., firm of Manhattan Construction Co., National Gypsum is investing approximately \$5,000,000 in an ultramodern paper mill.

National Gypsum Co. owns and operates ten gypsum wall-board manufacturing plants including those at Medicine Lodge, Kans.; Rotan, Texas; and Fort Dodge, Iowa. For some time a dependable source of paper to enclose the gypsum in the sheets of wall board has been needed. The Pryor mill is in a near-ideal location. With plenty of waste paper available for reclamation in the nearby cities of Tulsa, Muskogee, and Oklahoma City, the mill will be able to turn out 150 tons a day for the company's use, utilizing a waste product usually burned or thrown away. Pryor is roughly in the center of the area covered by the three manufacturing plants.

Plant Design

Measuring 580 x 242½ feet, the new mill will be the most modern in the nation, according to its manager, Paul J. Dumas. Other mills may be bigger, but this one will use ultramodern machinery and methods, particularly in the preparation of pulp stock from the waste paper.

Served both by highway and by a spur line of the Missouri Kansas & Texas Railroad, the mill will be a single-story building with a deep basement floor beneath. National Gypsum Co.'s own engineering department did all planning and designing, under the general supervision of S. D. Skinner, Chief Engineer. Collaborating were L. L. Hauk, Production Manager of Paper Mills, and W. J. Sprau, Paper Mill Engineer. One of the factors now contributing to good progress by the contractor is the presence in the field of W. I. Ritter, an engineer who helped in the design work. When adjust-

ments are necessary in the field, the decisions are made quickly.

Building foundations and the lower walls are of reinforced concrete. The floors are of beam and slab design, with some of the floors carried on highly compacted fill and others supported by reinforced-concrete columns from the basement. The upper part of the building will consist of a structural-steel skeleton, with tile walls and yellow brick facing on the exterior.

An open steel-truss type of construction will be used in the largest bay of the main building, with wide-flange beams elsewhere. There are to be two 15-ton cranes in the crane bay, for the service and repair of mill equipment. A slab roof will top out the mill, with National Gypsum Co. insulation and a tar and gravel top. Grounds are to be landscaped, and the mill area enclosed within a Cyclone fence.

Unusually interesting problems in the design of floor slabs were solved, with the result that slabs from 6 to 10 inches are being placed. Some of the floor loads, particularly when heavy rolls of paper are stored, will be great. A warehouse was built first of all as a part of the contract. It will house some of the machinery and construction materials during building.

Flow Plan

The mill layout is a continuous assembly line. Baled waste paper will enter the mill either by rail or highway. Bale wires will be snipped, and the paper will pass up three conveyors to 12, 14, and 20-foot Hydrapulpers, which quickly reduce the material in size and reject foreign matter.

Passing through Hydraclones, classifiers, thickeners, tile-lined storage chests, and a packer screen system, the raw material will then be ready to enter the paper machine. It will consist of vats, presses, dryers, calenders, reels, and winders. Equipment is the most modern yet made. It will cost a bit more at the outset than older machines, but the investment will pay off in more produced tonnage per day. The Pryor mill is rated at 150 tons per day of output.

(Continued on next page)

C. & E. M. Photos



Here tile setters place acid-resistant lining in one of the banks of storage chests.



C. & E. M. Photo

An Allis-Chalmers HD-5 and Tracto-Shovel load excess dirt into a Ford truck.



C. & E. M. Photo

This Tulsa winch on a Chevrolet truck unloads steel reinforcement.

One of the problems the designers did not have to solve was a source of power and other utilities. The plant site was purchased by National Gypsum from the Grand River Dam Authority, in a tract of land adjacent to World War II's Oklahoma Ordnance Works. A steam plant which the Government constructed at that time is being operated, along with other utilities, by GRDA. The mill will purchase from Grand River Dam Authority all steam, electric power, water, and even compressed air which the mill will use.

Subcontractors Used

Manhattan Construction Co. is using several specialty subcontractors to make the job move fast. Piping and the installation of pumps is being done by Spaeth Engineering Co. of Tulsa. Beacon Electric Co., of Buffalo, N. Y., is doing the electrical work. Dump and machine chests are being fabricated by Kalamazoo Tank Co. The company contemplates setting the structural steel by subcontract, and W. R. Holway & Associates of Tulsa has helped out from time to time on local engineering, though not on a subcontract.

J. Don Smith, General Superintendent for Manhattan Construction Co., is also the coordinator for activities of the various subcontractors. Walter Lewis is in charge for Spaeth Engineering Co., and Charles Greenan is Beacon's Superintendent.

Excavation

Construction work got under way in March, when a D8 and a LeTourneau Carryall came in with a second D8-mounted dozer to start the excavation. Hauls were short, and the clay-gumbo material was easy to dig. The material was dumped out over the property where an International TD-14 with a Bucyrus-Erie Bullgrader could level it off later on, as it was not acceptable for use in backfilling.

An exceptionally favorable spring, without the usual rainy spells, made it possible for Manhattan to make good progress. In a few weeks concrete had started, and less than 6 weeks after the project got under way most of the concrete work was well above original ground level.

The excavation item also includes the compaction of backfill under certain floor slabs, around walls, and around roadways and ramps. National

Gypsum's engineering department specified densities of 95 per cent, referred to the modified AASHO testing method. Such densities have been extremely hard to get, but samples have run

very close to the specified figure. The field engineers will forgive one or two per cent under the 95 figure, but anything less than 90 is taken out and reprocessed.

The earth for these fills is being hauled in by truck, after being loaded by a D4-mounted front-end loader and an Allis-Chalmers HD-5 and

(Concluded on next page)



"Our Plymouth is most satisfactory!"

Every Plymouth Locomotive is engineered and built to cut costs, speed production, and stay on the job—year after year—with the lowest maintenance. These performance features mean SATISFACTION for Plymouth owners and operators!

"Our 8-ton Plymouth Locomotive has been hauling surface clay 50 hours a week for over two years," writes the Bickerstaff Company, Columbus, Georgia, owners of the locomotive shown above. "Plymouth

provides the power and speed we need to keep the clay moving—and the operation economy we need to keep hauling costs down. Our locomotive is most satisfactory in every respect."

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C. & E. M. Photo

Three key men on the paper-mill job: left to right, General Superintendent J. Don Smith, Assistant Superintendent C. M. Sparks, and W. I. Ritter, Project Engineer.

National Gypsum Co. Builds a Paper Mill

(Continued from preceding page)

Tracto-Shovel. Spread by a D8-mounted dozer, the earth is then tamped in by two heavy sets of sheepfoot rollers, pulled singly by an International TD-14 and an Allis-Chalmers HD-10 tractor. If necessary, the earth is moistened to an optimum content of about 13 per cent prior to compaction.

For close-in places around walls, where it is impossible for sheepfoot rollers to reach, a Schramm compressor and two Ingersoll-Rand pneumatic tampers are being used.

Concrete Work

Exposed concrete in all parts of the building calls for plywood facing. A central carpenter yard with power saw equipment turns out the 8-foot form panels, which are then set up in the field. Studs are conventional 2 x 4's, on 12-inch centers, and the wales

are doubled 2 x 4's. Richmond patented steel ties are being used to lock the opposite form sides together. Form panels are oiled just prior to installation.

An unusually efficient small-output concrete plant has been set up, which delivers concrete at a rate great enough to permit rather extensive placement. There is a Winslow Binanbatch weighing hopper, a 3/4-yard Schield Bantam truck-crane clam for charging the hoppers, a Jaeger and a Gilson 18-S concrete mixer, one on either side of the Binanbatch delivery beam, and 3 Getman Scoot-Crete concrete buggies for the delivery of the material.

Sand and aggregates for the concrete mix are produced at commercial plants within a 15-mile radius. Atlas sack cement is being used, without air entrainment. A 6-sack batch is giving phenomenal results. Compressive strengths up to 6,000 pounds are reported.

Concrete-placing equipment includes a portable timber ramp and dumping platform for the Scoot-Cretes to use while dumping the fresh concrete into a 1-yard Blaw-Knox transfer bucket. The concrete is handled by a Lorain crawler crane, which swings the material over to the point of placement. A gas-driven Mall vibrator is on hand at every pour. Reinforcing steel is ordinarily heavy, so the concrete is placed in most of the walls at a slump of 2 to 2 1/2 inches. It is stripping out nicely.

By the time you read this article, structural-steel erection will be well along, and the exterior of the building should be taking shape. It is expected that the structural erector will use a standard-model crawler crane, since the heaviest structural member is only a 27 WF 94-pound beam.

There will be a heavy lift when the main turbine-driven power shaft, 40 feet long, is installed. It will operate 12 various power-transfer units by means of a belt drive.

Because of its unusually efficient design, the new mill will employ less than 70 people—fewer than the usual number of employees in a 150-ton mill. When the mill begins operation late in 1951 or early in 1952, private enterprise will have provided for eastern Oklahoma a new industry and new jobs for its people. For itself, it will have guaranteed a source of vital paper for an important building material—wall board. It will have added to the productive capacity of the nation and reclaimed a waste material for productive use.

Fountain Pen for Lettering

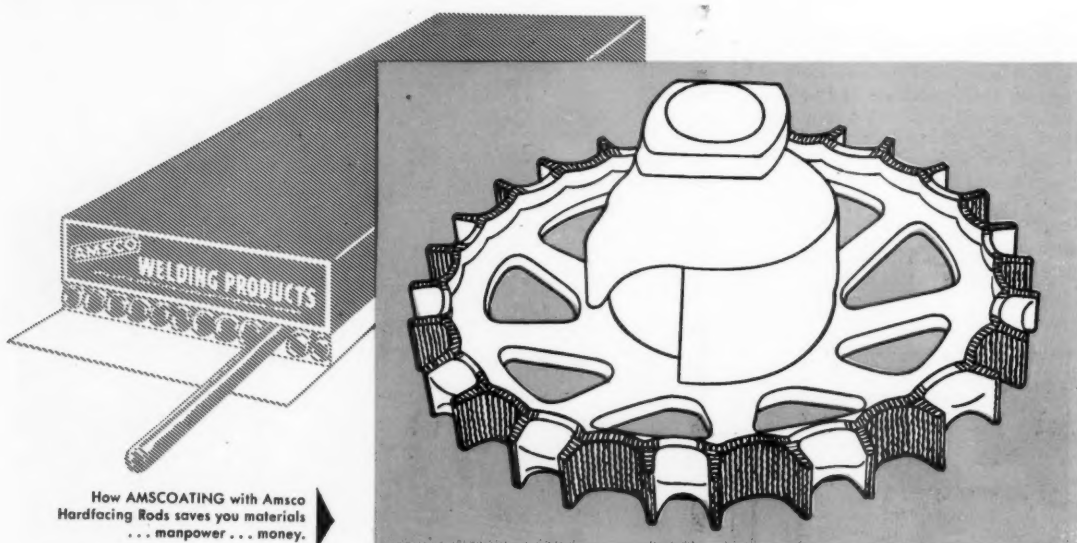
Literature describing the Pelican Graphos, a fountain-type pen for lettering and drawing, is available from John Henschel & Co., Inc., 105 E. 29th St., New York 16, N. Y. The pen has interchangeable nibs of various sizes and shapes for ruling, lettering, and drawing. The booklet illustrates the results that can be obtained. Also available is a color card indicating the variety of waterproof drawing inks which may be used with the Pelican Graphos. A price list and other data are included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 568.

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To top it off, sprocket replacements can practically be eliminated. An AMSCOATED sprocket can be reclaimed over and over again... at about half the cost of a new one!

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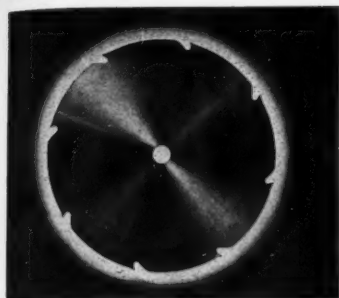
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The Safti-Cut saw blade is designed to give smooth cuts fast and consume less power than other blades.

Radical New Blade For Circular Saws

A new kind of circular saw blade that departs radically from conventional saw-blade design has been developed by Western Saw Manufacturers, Inc., 1842 W. Washington Blvd., Los Angeles, Calif. The Safti-Cut blade has only eight or twelve cutting teeth. It is claimed to give smooth cuts fast, with approximately 30 per cent less power consumption than other blades. It is available in 6 to 16-inch diameters for any style of arbor hole.

The cutting teeth project only 0.020 inch above the noncutting edge. This is said to prevent loading up of the blade teeth, which may cause blades to crack; it also permits the noncutting edge to control the bite of the blade. Kick-back and serious accidents caused from the operator's hands being pulled into the fast-moving blade are practically eliminated, Western Saw says. The fact that there are fewer teeth reduces blade noise and makes resharpening easy.

ening easy. Tooth design is said to lengthen the life of the blade between resharpenings, and to eliminate the danger of spontaneous combustion, since chips are produced instead of sawdust.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 604.

Solves Square Roots In Matter of Seconds

There is good news for the engineer and contractor pressed with the problem of solving many square roots. A new calculator manufactured by Friden Calculating Machine Co., Inc., 2350 Washington St., San Leandro, Calif., will determine the square root of 10-digit numbers in 9 seconds—without the use of tables of any kind. The manufacturer reports that the machine will automatically extract the square roots and point off the correct decimal point in the root simply by the entry of the number and the touch of one key.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 566.

Flying Begins at 40

At 41, an executive is too old to drive a car on regular extended business trips; an airplane is the way to get around. So says Bill James, Vice President of T. L. James & Co., Ruston, La., a firm which constructs highways, airports, military bases, and dams. Bill says his own health has been better and his company's business has been better ever since he began flying a



Bill James, left, gets ready to take off in his firm's Super 260 Ryan Navion after inspection of Enid Dam in Mississippi. The trip home to Ruston, La., will take him an hour and ten minutes, instead of the six hours needed by car.

Navion in 1946. Now T. L. James has three Navions.

Bill is on the go constantly between project locations, inspecting and bidding on new jobs. To prove that flying is the only way, he cites a trip made

regularly between Ruston and a dam project in Mississippi; by car it takes six hours; by plane it takes an hour and 10 minutes. The company has built eight landing strips for their planes at field offices and camps.

More Pay Dirt with ROLL-ACTION

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That's why they're called the "ROLL-ACTION" blades. Watch them in action—ROLL ACTION—then put

them to work for yourself, *pitching bigger payloads for your profit.*

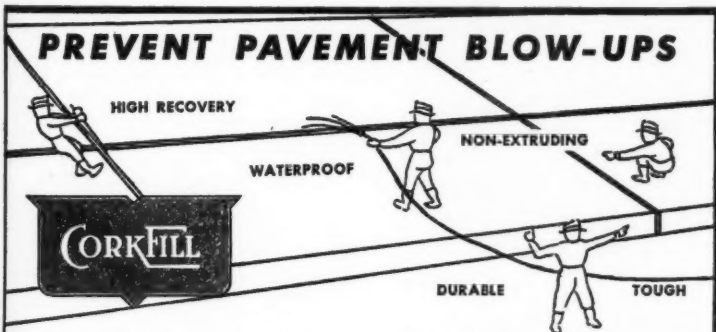
BAKER makes a complete line of Bulldozers, Graders, and Root Rippers for the entire line of ALLIS-CHALMERS Crawler Tractors. THE BAKER MANUFACTURING COMPANY, Springfield, Illinois.

Write for Bulletin No. 895 or see your Baker, Allis-Chalmers dealer for full data on...

The dozer with the "Payload Pitch"



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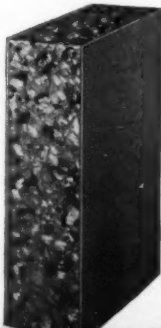
CORK AND ASPHALT EXPANSION JOINTS

Outstanding joint efficiency—completely free of maintenance problems—and amazingly easy to install are just a few of the reasons why engineers over the nation recommend Corkfill Expansion Joints. W. R. Meadows, Inc., pioneers in asphalt and fibre joints, now introduce this new cork and asphalt composition expansion joint that greatly outperforms other joint materials where resiliency and non-extruding properties are desirable.

Blow-ups, spalling and other pavement maintenance problems are minimized with Corkfill joints. Corkfill has a high recovery of over 85% as against 70% for fibre joints. By comparison it is highly waterproof, light in weight; it has a high tensile strength making it less subject to breakage when installing. Approved by U. S. Engineers and Navy Department as well as under AASHA Specifications M-59, Type VI. Most State Highway Departments accept Corkfill under current fibre joint specifications. Samples and prices are available on request. See your Sealtight Distributor today.

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TONGUE AND GROOVE JOINTS
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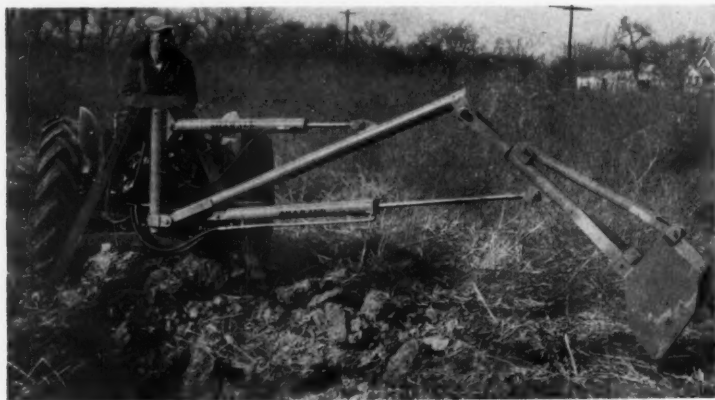


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ELGIN • ILLINOIS



Shawnee Mfg. makes this small ditching unit. The bucket—available in 10 to 20-inch sizes—has an 11-foot reach behind the tractor.

Small Ditching Unit

A small-size ditching unit for rear mounting on Ferguson, Ford, Ford-Ferguson, and other tractors is made

by Shawnee Mfg. Co., 1947 N. Topeka Ave., Topeka, Kans. It has a high clearance for dumping and swings 75 degrees to either side. The rugged base frame is forced down by the transport

cylinder for solid footing while digging. The bucket has an 11-foot reach behind the tractor. Buckets are available in sizes from 10 to 20 inches in 2-inch increments. Maximum digging depth for the Shawnee ditcher is 7 feet. The manufacturer reports that the ditching buckets are designed to empty all types of soil.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 685.

Self-Lock Fastener

A one-man expansion-sleeve-type fastener is announced by Square Tool & Die Co., Chicago Drill Division, 1550 N. Fremont St., Chicago 22, Ill. It is designed to eliminate the helper needed for inserting and tightening up a conventional bolt and nut. This self-locking sleeve bolt fastener has no nut. The bolt is inserted in a hole; a pneumatic tool drives the bolt through the sleeve and 6 prongs expand at the bottom of the sleeve; the bolt head automatically



Square Tool & Die makes this expansion-type fastener. It has no nut, so a second man or helper is not needed.

countersinks itself below the wood surface.

The fastener is made in sizes from 1/4 to 1-inch diameter, in lengths from one inch up. Heads are hex, square, round, flat, or slotted.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 555.

Vertical Turbine Pumps

An 8-page catalog about vertical turbine-type pumps has been prepared by Ingersoll-Rand Co. It covers construction features of the APH-APK line, tabulates dimensions, pictures installations, and lists uses—among them, dry-dock dewatering, condenser circulating, cooling-tower service, general water supply, bulk liquid transfer, and similar services where suction is taken from an open source.

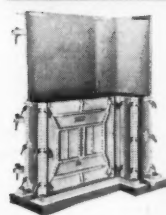
The pumps are available in single or multistage construction, with any desired column length. They range in size from 6 to 30 inches for capacities to 15,000 gpm and pressures to 250 psi. They come in two types of shaft construction—open water-lubricated or enclosed oil-lubricated.

To secure Catalog 7228 write to the company at 11 Broadway, New York 4, N. Y. Or use the Request Card at page 16. Circle No. 628.

Robert I. Ingalls Dies

Robert I. Ingalls, Sr., President and Chairman of the Board of Ingalls Iron Works Co., died in July in a Birmingham, Ala., hospital. Mr. Ingalls began his career in 1909 with the purchase of an abandoned machine shop in Birmingham; he built it into the largest independent steel-fabricating organization in the U. S.

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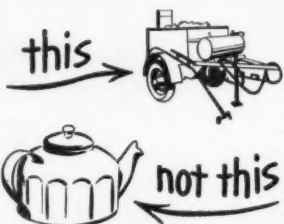
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A Dodge "Job-Rated" truck is engineered at the factory to fit a specific job . . . save you money . . . last longer.

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Every unit that **SUPPORTS** the load—frame, axles, springs, wheels, tires, and others—is engineered right to provide the strength and capacity needed.

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Give a Dodge "Job-Rated" truck the rough treatment your job demands . . . and watch it perform with low-cost dependability year after year!

Plenty of thrifty power! For example, 2 1/2-ton models have a rugged, powerful engine that's rated at 114 h.p. And, to assure even greater power with top economy, high-tonnage models (2 3/4-ton and up) are offered with twin carburetion and exhaust system.

But that's not all! Back a Dodge into a tight spot—see how easily and sharply it turns, how easily the steering wheel turns! New worm-and-roller steering gears on many models are just one of many reasons why Dodge "Job-Rated" trucks are easier to handle.

Then consider advantages like the new moistureproof ignition system and new high-torque capacity starting motor—and you'll know why new Dodge "Job-Rated" trucks are more dependable, even in the worst weather.

You'll save in many ways with a truck that fits your construction operation—a Dodge "Job-Rated" truck. Talk it over with your friendly Dodge dealer soon!

"Job-Rated" TRUCKS DO THE MOST FOR YOU

Maryland Extends U. S. 40 Westward

Relocation Has Two 24-Foot Concrete Pavements Separated
By a 50-Foot Depressed Park on 200-Foot Right-of-Way

• THE State Roads Commission of Maryland is extending U. S. 40 as a dual concrete highway on a new location another 5.2 miles westward from Baltimore toward Frederick. This newest improvement begins at West Friendship, where the existing dual road ends, and runs westward to Morgan Road. Located in Howard County, the new alignment is about ½ mile north of the original U. S. 40—a narrow 18 to 20-foot stretch of tortuous macadam with many curves and sharp verticals that are hazardous to the heavy traffic carried by this major route. U. S. 40 begins in Atlantic City, N. J., and crosses the country to San Francisco, Calif.

Construction got under way in July, 1950, when the State Roads Commission awarded a contract to the Williams Construction Co. of Middle River, Md., at its low bid of \$1,439,055. The Commission provided a 200-foot right-of-way, plus slope easements, for the divided highway to accommodate two 24-foot reinforced-concrete pavements that are separated by a 50-foot strip of park depressed at the center 17 inches below the roadway grade.

With this wide median divider, there is ample space for the addition of another 12-foot lane of pavement in the park area on each side, if future traffic requires two 36-foot roads. Such planning is incorporated in the new paving, which is crowned along a line 6 feet from the inside edge rather than at the middle of the 24-foot slab. Thus when another lane is built, the crown will be at the center of the 36-foot pavement; the concrete surface slopes to each side at the rate of ¾ inch to the foot.

Along the outside edge of pavement there is a 10-foot stabilized gravel shoulder, pitched ¼ inch to the foot. In cut sections the roadway drops off in another 4 feet to the ditch line. Cut slopes, and fill slopes of 8 feet or greater, are 2:1. Fill slopes under 8 feet are 4:1. Both cut and fill slopes are covered with 4 inches of topsoil, seeded and mulched. The center park section is similarly treated with a 6-inch layer of topsoil. The pavement is laid on a 6-inch course of Type 2 subbase which extends a foot into the park area on the inside, and under the shoulder to the slope line on the outside.

Grading

From July to December of last year, the contractor was engaged in grading and drainage operations. Class 1 excavation totaled 852,000 cubic yards, which was moved chiefly with 5 Caterpillar DW10's and scrapers, 4 Caterpillar D8 tractors and scrapers, and 8 bottom-dump Euclids loaded by a Euclid loader. Less rock was encountered than expected; consequently the dirt

material went further in the fills and a waste of 80,000 yards developed. This excess yardage was used to widen some of the fills, and to level off an adjoining field for a farmer. Fill embankments were built up in 8-inch lifts, and compacted both by the hauling equipment and by sheepfoot rollers. Leveling was done by 4 D8 dozers.

Sand-gravel for the 6-inch Type 2 stabilized subbase was obtained from a borrow pit near Waterloo, Md., necessitating a 25-mile haul to the job. A Model 6 Northwest 1½-yard shovel



C. & E. M. Photo

This Rex 34-E dual-drum paver, with a 30-foot boom, mixed each batch of concrete for U. S. 40 at least one minute. Here it dumps in front of a Blaw-Knox spreader.

dug out and loaded the material into a fleet of as many as 40 trucks that end-dumped it on the subgrade. It was spread and shaped by Caterpillar motor graders, and rolled by 10-ton 3-wheel

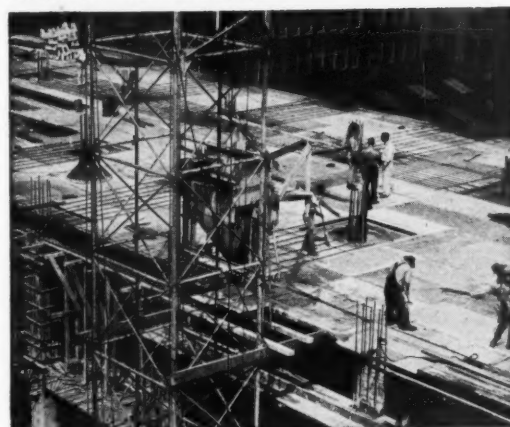
rollers.

Over 7,000 linear feet of 18 to 60-inch-diameter reinforced-concrete drainage pipe was laid along with the grading

(Continued on next page)



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Smooth concrete industrial building surfaces

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All over America contractors report that Formfilm is the answer for the protective coating of plywood forms. Formfilm eliminates all oil staining and sharply reduces rubbing costs.

Advantages of Formfilm

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Dept. C, Scranton 2, Pa.

Maryland Extends U. S. 40 Westward

(Continued from preceding page)

work. A Northwest $\frac{3}{4}$ -yard backhoe dug the trenches for most of the pipe work.

Also included in the contract is a grade-separation bridge carrying the new U. S. 40 over State Route 97 at Cooksville. The 50-foot girder span has a 7-inch concrete deck topped by a 2-inch asphaltic-concrete wearing surface.

Batch Plant

From last December until May of this year, the project was shut down. With favorable spring weather, the grading and subbase were completed to permit the start of paving by mid-June. The new stretch of divided highway is scheduled to be completed by October 15.

Part of the spring preparations for paving was the setting up of a batch plant just off the highway near the bridge over State Route 97. Two Blaw-Knox bins were erected—a 3-compartment aggregate bin and a 400-barrel cement bin. Sand and stone for the fine and coarse aggregate were delivered by truck—sand from the Arundel Sand & Gravel Corp. of Baltimore, and stone from the Grove Stone Co. of Frederick. A Model 6 Northwest crane with clam-shell bucket charged the storage bins from adjoining stockpiles.

Bulk North American air-entraining cement was shipped from a mill near Hagerstown, Md., to a siding of the Baltimore & Ohio Railroad at Hoods Mill, Md., 2 miles from the plant. There it was unloaded by the conventional worm gear and elevator into a B-K 400-barrel cement bin. Two covered trucks, holding 40 barrels each, transferred the cement from the bin at the siding to the bin at the plant.

37.4-Cubic-Foot Batch

The weights of a typical 37.4-cubic-foot batch of concrete on this project were as follows:

Cement	814 lbs.
Sand	1,462 lbs.
No. 6 stone	1,462 lbs.
No. 2 stone	1,460 lbs.
Water (43.3 gallons)	359 lbs.

Total 5,557 lbs.

Water for the mix was pumped from the south branch of the Patapsco River near the railroad siding at Hoods Mills, and hauled to the paving operations in two tank trucks holding 1,500 gallons each. There it was transferred to a 2,700-gallon tank truck that always remained at the paver; the transfer was made with a 2-inch pump set up on the 2,700-gallon tank. From this supply tank the water was pumped to the paver through 80 feet of 2-inch hose line by the pump on the paver. Dry batches were hauled to the paver in a fleet of 10 to 15 trucks holding two batches each, with the cement carried in closed metal tanks. The maximum haul from the batch plant to the extreme end of the job was a distance of 3 miles.

Gradation of the two sizes of coarse aggregate and sand used in the mix was as follows:

Sieve Size	Per Cent Passing		
	No. 2 Stone	No. 6 Stone	Sand
2 1/4-inch	100	....	....
2-inch	90-100	....	....
1 1/4-inch	35-70	100	....
1-inch	0-15	90-100	....
3/4-inch	0-5	25-60	....
1/2-inch	....	....	100
No. 4	....	0-10	95-100
No. 10	....	....	45-80
No. 30	....	....	20-60
No. 50	....	....	10-30
No. 100	....	....	1-8

Paving Preparations

About 10,000 linear feet of Blaw-Knox forms were brought to the project for laying the 9-inch uniform reinforced-concrete pavement in 12-foot lanes. A minimum of 1,500 feet of forms



C. & E. M. Photo

A Roadgrader gage was used on the Maryland highway extension. Attached to each side of the grader-blade moldboard, it can be regulated to cut subgrade to any depth and throw off surplus.

was always kept ahead of the paver. Grade for the lines of forms was established with a Caterpillar motor grader, No. 12 model, after which the form pins were driven with a Cleveland pneu-

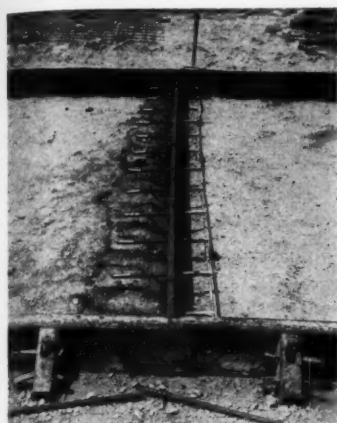
matic hammer powered by a Worthington truck-mounted air compressor.

With the forms in place, the motor grader dropped back between them to where the work was to start. A Road-

grader gage, a patented piece of equipment, was then attached to the moldboard of the grader blade on each side. The gage could be regulated to cut the subgrade to any desired depth, and throw the surplus material to one side. Another blade, 2 feet long, was carried along beyond the form on the side where the dirt was being spilled, to keep the form from being covered over. A bunch of flexible cables was drawn along by the gage to sweep all traces of dirt from the bottom of the form.

With this rig the contractor averaged 1,000 feet of fine-grading per hour, cutting to within $\frac{1}{2}$ inch of the desired grade. A Buffalo-Springfield 10-ton 3-wheel roller then pulled along a Cleveland Trailgrader to make the final adjustment which was checked right behind with a Cleveland scratch template. The forms were oiled, the subgrade wet down and then the transverse expansion joints were installed at 600-foot intervals.

The expansion material is a $\frac{3}{4}$ -inch (Concluded on next page)



C. & E. M. Photo

Expansion joints were installed every 600 feet on U. S. 40. Highway Supply Corp. assemblies were used.

thickness of cork left 1/2 inch beneath the top of the slab and covered with a metal cap which is later removed by

the finishers. Going through the joint are 15 x 3/4-inch dowels on 12-inch centers. Joint assemblies were supplied by the Highway Supply Corp. of Jessup, Md.

Finishing the Concrete

Batches were mixed a minimum of one minute in a Rex 34-E dual-drum paver equipped with a 30-foot boom, and always located outside the 12-foot lane being paved. The paver drum turned at the rate of 16 rpm. The concrete was discharged from the bucket in front of a Blaw-Knox paddle-type spreader that leveled it off 7 inches up from the bottom. Wire-mesh reinforcing was then laid on top of this initial layer of concrete, and longitudinal dowels were pushed through holes in the forms to tie the adjoining lane to the lane being laid. These dowels were 48 inches x 5/8 inch, and were inserted on 48-inch centers with half their length in one lane, and the other half in the adjoining lane. Wooden keys were bolted to the sides of the form to further the bond



C. & E. M. Photo

A Prairie Schooner trailer makes a handy field office for state engineers on the U. S. 40 extension project in Maryland.

between the pavement lanes.

More concrete was then added and struck off level with the tops of the forms to cover the steel mat. Behind the spreader was a Blaw-Knox dual-screed finisher, followed by a Koehring

Longitudinal Finisher. No vibrators were used, but the concrete along the forms was spaded by hand. A steel joint-cutter was carried along at the rear of the Koehring machine, and every 40 feet a transverse contraction joint was cut by hand into the surface of the concrete. Steel strips, 2 3/4 inches deep x 3/8 inch thick x the width of the lane, were inserted into the transverse slot cut in the concrete.

The surface of the slabs was then floated over by hand, checked with 10-foot straightedges, and finished off with a pass from a 12-inch leather belt. The herringbone marks left by the belt were removed with a burlap drag. Finishers removed the steel strips from the dummy joints with their pliers, then edged them off with a 1/4-inch-radius tool. The contractor used specially made edging tools of stainless steel, 3 1/2 inches wide x 10 inches long with a 1/2-inch lip. The concrete was cured with Pave-Cure membrane compound applied by a Thompson spray machine.

Quantities and Personnel

Both roadways east of the grade-separation structure were paved first, followed by the rest of the project west of the bridge. After each day's work the joints were poured with asphalt. At the start of operations with a green crew, the contractor averaged 2,000 linear feet of 12-foot pavement in a 10-hour day. As the men gained experience, the rate of production gradually increased to 2,500 linear feet per day.

Major items in the 5.2-mile divided-highway contract include the following quantities:

Class 1 excavation	852,000 cu. yds
Subbase, type 2	55,000 cu. yds
Stabilized shoulders, 6-inch	49,000 sq. yds
Reinforced-concrete pavement, 9-inch	154,000 sq. yds
Reinforced-concrete pipe, 18 to 60-inch	7,081 lin. ft.

Williams Construction Co. employed an average force of 65 men on the project, under the direction of Darwin Riden, Superintendent, with Harry C. Terrell, Concrete Foreman.

For the Maryland State Roads Commission, E. Kirk Chism is the engineer in charge under District Engineer E. G. Duncan with headquarters at Laurel, Md. Field office for the state engineers is in a Prairie Schooner trailer. The Engineering Division of the Commission is headed by William F. Childs, Jr., Chief Engineer, with Walter C. Hopkins, Deputy Chief Engineer, and C. A. Goldeisen, Assistant Chief Engineer of Construction; their headquarters are in Baltimore.

Manages Engine Sales

E. G. Henderson has been appointed General Sales Manager of the Universal Motor Co., marine-engine manufacturer of Oshkosh, Wis. He joined the Universal staff in 1937.

In order to fulfill some of its Government contracts, and to deal with increased orders for marine engines and electric plants, Universal has added a 112-foot extension on one side of its factory. A contract to build 7 new 16-foot bays was let to a local firm.

BEST BUY FOR TOMORROW

Since the early days of steam power and horse-drawn wagons, Bucyrus-Erie machines have worn the crown of excavator leadership. Today's Bucyrus-Erie assures you top-notch shift-after-shift performance on your present contract and during the years ahead. "Excavator trained" engineers combine the finest materials available with modern advanced design to produce a machine with outstanding durability and long life. Upkeep requirements are extremely low—adjustments easily made, long lasting. All machinery is readily accessible for maintenance.

Bucyrus-Erie's famous in-the-field convertibility lets you change front ends quickly and easily, so one excavator can handle a variety of chores on the same job by switching front end equipment in a matter of hours. Shovel, dragshovel, dragline, clamshell and crane attachments are constructed with the same precision and sturdiness as the main machinery—built to last the life of the machine.

Now is the time to be sure that the excavator you buy will keep your output high for many years to come. See your Bucyrus-Erie distributor for the whole story on this long-lasting line of 3/4 to 4-yard gasoline, diesel and single motor electric excavators.

296E51C



SOUTH MILWAUKEE, WISCONSIN

Features Excavator Line

Working views of Marion all-purpose excavators are shown in Bulletin 403 issued by Marion Power Shovel Co., Marion, Ohio. Starting with the 93-M dragline on the cover, then the 33-M $\frac{3}{4}$ -cubic-yard shovel, the booklet lists

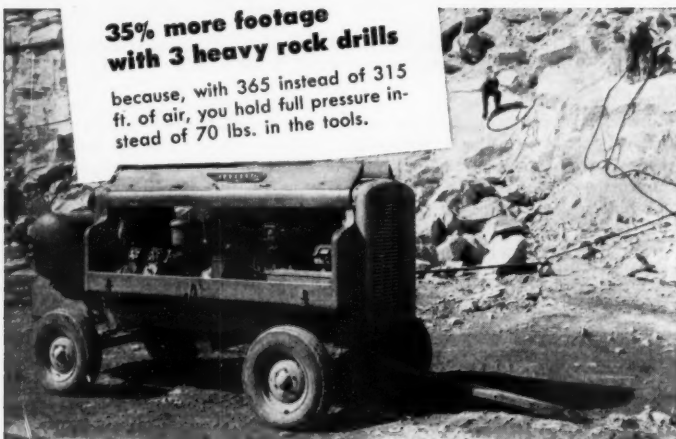
condensed specs and the types of service to which the machines can be converted—shovel, dragline, clamshell, crane, backhoe, and pile driver.

Copies of the two-color 32-page catalog can be secured from the company. Or use the Request Card at page 16. Circle No. 627.

same men, same tools do 4 days' work in 3

35% more footage with 3 heavy rock drills

because, with 365 instead of 315 ft. of air, you hold full pressure instead of 70 lbs. in the tools.



75 ft.
125 ft.
185 ft.
250 ft.
365 ft.
600 ft.

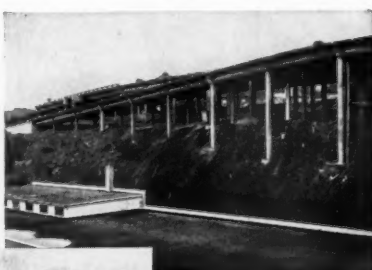
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deliver 15% to 25% more 100 lb. air at lowest cost per cubic foot of any compressors on the market, to run tools at their full efficiency.

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FULCO COTTON CONCRETE CURING MATS



ON THE JOB

At the Huge
Alaskan Way
Viaduct
in Seattle,
Washington

Shown in the photographs above is a portion of the giant Alaskan Way Viaduct under construction by McRae Bros., Contractors, of Seattle, Washington. This million dollar project is one of many using the curing efficiency of Fulco Cotton Concrete Curing Mats. Fulco mats, sturdily designed of tough cotton fabric with stitched edges and seams, insulate against sudden temperature changes, stay wetter longer, and increase the flexural strength of the concrete—and they may be used over and over again, making the cost per job almost negligible. Use Fulco Cotton Concrete Curing Mats for best curing results on your concrete jobs. See your equipment dealer or write direct for prices.

Fulton also manufactures sturdy, top quality
Triple Strength Tarps, drop cloths, and tents.
Indispensable protection at economical prices.

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Short-Wave Radio May Be a Hazard

All groups in the highway and construction industry will be interested to know that short-wave radio may create a serious hazard if operated in the vicinity of electric blasting. Pennsylvania State Police advised the Department of Highways of this hazard some time ago, as a result of a serious accident which was attributed to the use of a radio transmitter in the vicinity of electric fuses. In the interest of safety the Department issued a directive to all its personnel, regarding precautions to be taken. The directive is reprinted here because of its general interest.

"Radio vs. Electric Dynamite Caps: Information and tests show a real danger of exploding caps by using a two-way radio transmitter within 20 feet of an uncoiled wire on the caps. A grounding wire does not reduce the danger.

"Take these precautions: (1) If electric caps are within 25 feet of any two-way radio transmitter, keep tightly closed in an all-metal can. Never open can when transmitter is in use. (2) Never carry caps in a pickup or car equipped with a two-way radio unless they are in the all-metal can. (3) Do not use radio transmitter within 50 feet of any electric blasting.

"This danger is real. If the above precautions are followed there is no hazard."

Vises Are Improved

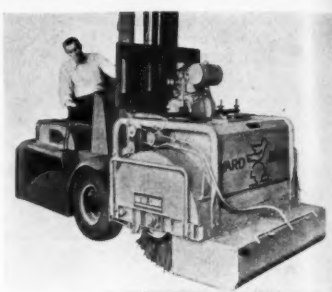
An improved line of malleable-iron vises is announced by The Columbian Vise & Mfg. Co., 9021 Bessemer Ave., Cleveland 4, Ohio. They are available in jaw widths from 3 to 8 inches.

Prime feature of the vise is a graphite-bronze self-lubricating bearing located at the front of the sliding jaw to absorb the thrust of the steel screw head. Also important are the steel-ball handle ends, forged from the handle stock itself. T-section jaw faces of hardened tool steel are pinned into the castings so they will not come loose in use but can be easily replaced if chipped or worn.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 560.

Civil Engineer for Lab Staff

Timber Engineering Co., of Washington, D. C., has recruited P. A. Wedding, Professor of Civil Engineering at the University of Maryland, as a consultant to the staff of its laboratory. Mr. Wedding served during World War II as a structural engineer with the Potomac River Naval Command.



The Yard Bird powered sweeper attaches to fork-lift trucks of 1,500-pound capacity and up.

Sweeper Attachment For Fork-Lift Truck

A powered sweeper for fork-lift trucks of 1,500-pound capacity and up has been introduced by Little Giant Products, Inc., 1530 N. Adams St., Peoria, Ill. The Yard Bird can cover 80,000 square feet per hour, the company claims, and features its own self-contained spray system for dust control.

The sweeper is of the pick-up type, with its brush whisking dirt and refuse into a full-width floating dust pan. The pan is said to be easily dumped for fast operation. By entering the forks of the lift truck at an angle, the Yard Bird can be used for snow removal. The company states that the sweeper can be attached to a fork lift in approximately 3 minutes.

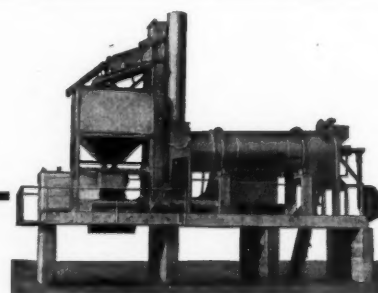
Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 591.

Mechanics for Beginners

An elementary text on mechanics and strength of materials in engineering application has been published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. Authored by Harry Parker, M. S., Professor of Architectural Construction at the University of Pennsylvania, "Simplified Mechanics and Strength of Materials" is written for the student or working man who has not previously studied mechanics or advanced mathematics. A working knowledge of algebra and arithmetic is sufficient to comprehend the problems in the text and arrive at correct solutions.

The material in the book has been arranged so that it may be used for home study. There are detailed explanations of the many illustrative examples. Tables of allowable stresses, properties of sections, and other engineering data are included so that reference to other books is not necessary.

This book may be obtained from the publisher at a price of \$4.00.



White Asphalt Plants For Moderate Paving

Complete stationary hot plants, on 1 steel frame, easily moveable, at reasonable prices. Excellent for medium size city paving. Successful for contractors on all street and highway maintenance; for driveways, sidewalks, industrial plants.

Supplied with oil fired rotary dryer, batch mixer, bitumen heater, vibrating screen, divided hot bin, dust collector, volumetric measure or weigh scales; air controls; engine or electric power.

Sizes: L-12, 12-15 tons per hour. Will pave 25' street, 2" thick, one 300' block per day.
L-25, 25-30 tons per hour. Will cover 20' road, 1" thick, at $\frac{1}{2}$ -mile per day.
Also portable repair plants, 4 and 8 tons per hour.

Write for catalog and name of nearest dealer.

Elkhart White Mfg. Co. Indiana

Steel Scaffold Has Other Use: Shoring

Have you considered using your steel scaffolding as shoring too? According to The Patent Scaffolding Co., the dual use has taken hold among contractors looking for a simple, practical, low-cost shoring.

Here are some of the "whys" the company cites: Since steel replaces wood, the danger of fire is practically eliminated. With steel frames or tubes the material recovery is 100 per cent. Steel shoring is not subject to warping, a common fault in wood structures. It is strong; safe working loads range up to 366 pounds per square foot for the sectional type of scaffolding, depending on the spacing between frames, type of frame, and location of blocking timbers on frames. It is easy to erect; frames 5 feet wide and ranging in height from 3 to 10 feet can be set up with a minimum of difficulty; adjustable legs lift frames and forms or blocking timbers to correct grade. Sectional steel scaffolding, which has its own self-contained system of bracing, eliminates the need for bracing lumber. By dual use the contractor saves equipment, materials, time, and labor. He can estimate his shoring and scaffolding costs more accurately.

There are two types of built-up steel scaffolding which can be used as shoring, the company explains—the coupler type and the sectional. Tube Lox, Patent's tube-and-coupler scaffold, requires only four basic components—interlocking steel tubes in various lengths, two types of couplers, and a base to distribute the load. Its Trouble Saver sectional steel shoring uses prefabricated, welded, steel frames as its basic units. These are easily assembled without tools, the company points out, and they have adjustable steel legs to provide accurate adjustments. Pivoted diagonal cross braces are secured by wing nuts. All parts are interchangeable to permit assemblies to satisfy most shoring conditions.

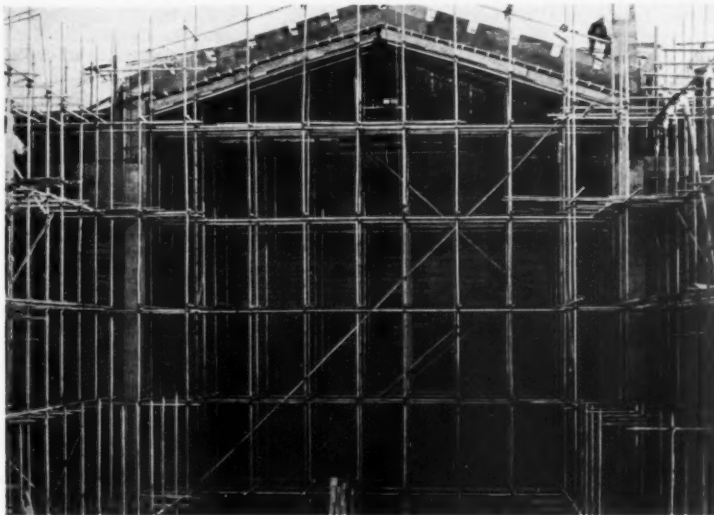
Equipment for Engines

Electrical equipment for diesel, gas, and gasoline engines is described in a 24-page illustrated booklet put out by The Leece-Neville Co., Cleveland 14, Ohio. Included are ac-dc alternator systems, generators, starting motors, hand and magnetic switches, and voltage regulators. The booklet also pictures the company's production, assembly, testing, and engineering facilities.

To secure a copy of "At Your Service—Leece-Neville", write to the company using the letterhead of your firm.

Alloys Warehouse in Houston

Wall Colmonoy Corp., Detroit manufacturer of welding alloys, has opened an office and warehouse at 5815 Clinton Drive, Houston, Texas. Henry L. Howard manages the office.



Tube Lox scaffolding was used here to shore the reinforced roof of an auditorium. A portion of the Tube Lox was installed along the walls in advance to support the reinforcing steel on heavy girders before the first pour was made.

For Roadside Work

A catalog describing power equipment which may be used for a variety of roadside operations is available from Gravelly Motor Plow & Cultivator Co., Dunbar, W. Va. This single tractor unit is available with various attachments which may be used for cultivating, mowing weeds or brush, spraying, plowing, rolling, and light hauling. The literature provides a detailed description of all of the attachments, their operation, and their applications for various jobs.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 689.

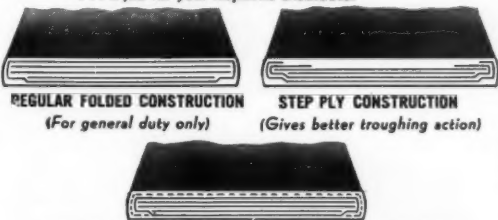
Allis-Chalmers V. P. Dies

William C. Johnson, Executive Vice President of Allis-Chalmers Mfg. Co., Milwaukee, died last June of a heart attack. He had been with the company since 1924, and was Chairman of the Board of Canadian Allis-Chalmers, Ltd.



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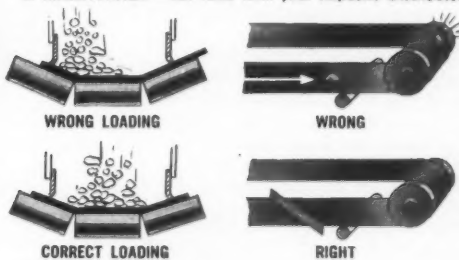
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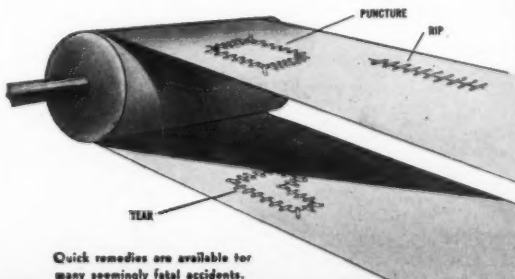
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Try, Try Again Tactics Enact a Road Program

Michigan Good Roads Federation Assesses Road Needs and Pushes Program Through Legislature After Three Defeats

• MAY 23, 1951, was a momentous day for Michigan highways. On that day the Michigan Good Roads Federation program was enacted by the Legislature over the Governor's veto.

Good Roads Program

Work on the program began in 1946 when the Michigan Good Roads Federation, alarmed by the deterioration of the state's highways and streets, decided to make an engineering analysis of road needs and their cost, highway administration, and revenue distribution among the various road and street agencies. J. P. Buckley, now Chief Engineer, Highways Division, Automotive Safety Foundation, was then completing a similar analysis for California. So the Federation selected him to organize the Michigan "Highway Needs" study. Six Federation directors comprised the study committee.

The report, published in February of 1948, was boiled down into legislative proposals and finally into bills for introduction into the Legislature. Following are the recommendations:

1. The 15-year program called for more road revenue from motorists—\$30,000,000 more than the \$72,000,000 they were paying in 1948—and \$10,000,000 more to be raised by local units of government and matched by state-collected revenues. No recommendation was made as to how much the gasoline tax should be increased, nor the car registration tax. But the program stipulated that the additional revenues should be raised from highway users rather than from the state's general fund.

2. The program called for a new basis for distributing road revenues—needs, instead of geographic divisions. The formula agreed upon would give the State Highway Department 44 per cent of the road revenues collected, the counties 37 per cent, and the municipalities 19 per cent. The Department would spend 40 per cent of its new construction funds within municipal limits, and it would bear wholly instead of partially the cost of trunk-line maintenance within cities.

3. Reforms in administrative practices were also recommended, to guarantee uniform accounting and reporting on the use of state-collected revenues. Other measures called for better planning and closer coordination among all road agencies. They recommended that the highway department serve as a clearing house for these activities and report biennially to the Legislature on both future plans and past accomplishments.

4. Employment of registered engineers on the staffs of county road commissions was another requirement. It was stipulated that members of the commission not be paid as wage or salary employees, and that the commissions devote their efforts to matters of policy.

Try No. 1

The Legislature was expected to act upon these recommendations in the 1948 special session. However, the good-roads program met its first rebuff when the Governor, despite his stated willingness to "carry the ball for good roads in Michigan," refused to allow the Legislature to consider an increase in the gasoline tax. The bills died in committee.

How Criticism Was Met

Only then did the Federation com-

mittee realize how complex were its recommendations. From all corners of the state criticism and complaints poured in. For example, many counties objected to the requirement of a full-time registered engineer. The northern part of the state objected to the new distribution formula. Counties, too, facing a decrease in revenues, protested. Cities—particularly the large ones—favored the new distribution plans but were lukewarm over the proposed gas-tax increase.

To answer these objections, Federation proponents made speeches in all corners of the state. Correspondence with newspapers ran into thousands of

letters. Work with the Michigan Municipal League and the County Road Association of Michigan helped to explain to their members the basis of and reasons for the new highway-fund distribution plan.

Try No. 2

Throughout the remainder of 1948 and the winter of 1949, meetings with county and city officials continued, until practically all criticism had been allayed. Yet no political leader arose to carry the Federation banner, mainly because the program was identified with an increase in the gas tax. Consequently, the program was bottled up

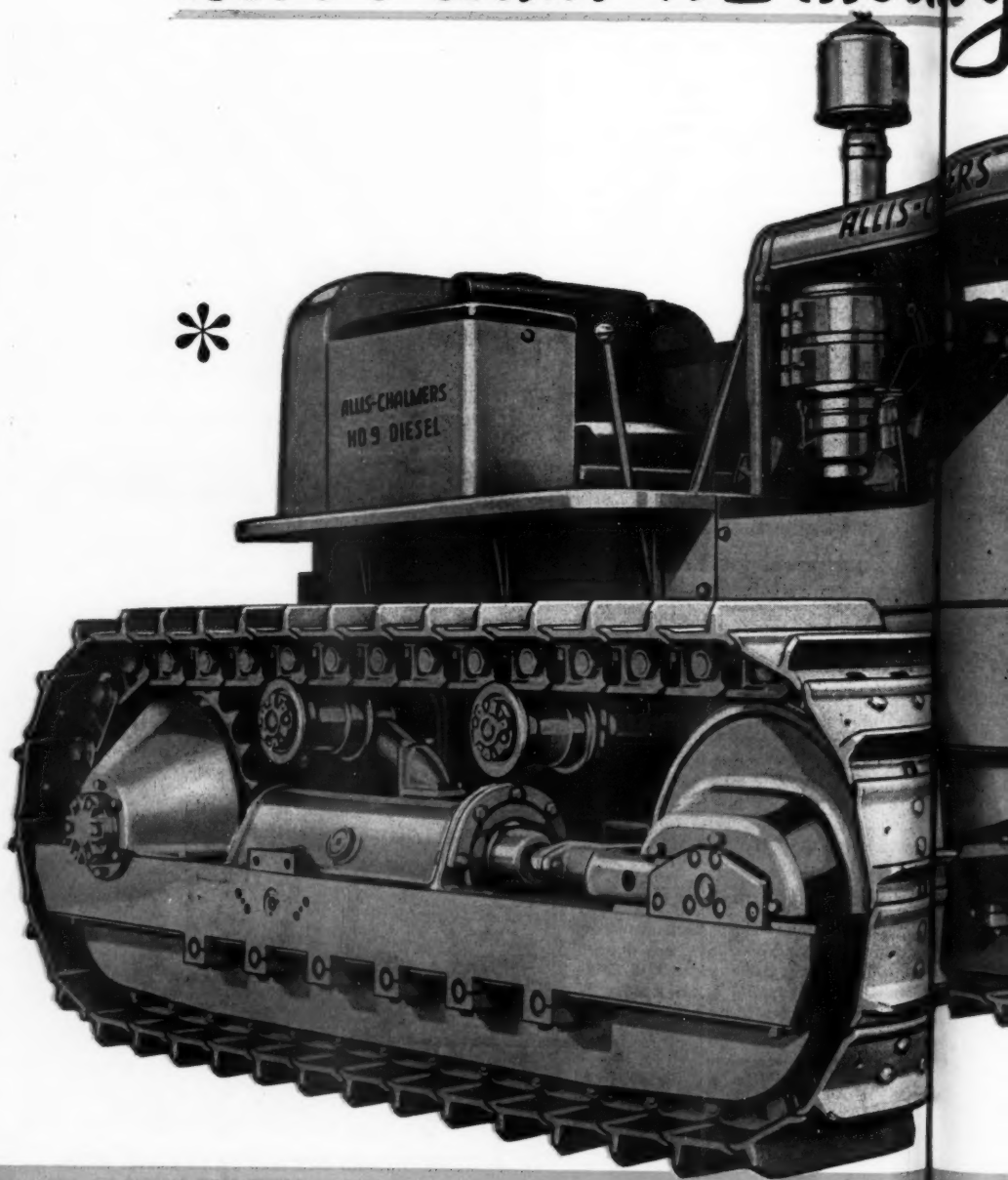
in committee in the 1949 session.

Try No. 3—Defeat Again

At this point, the Federation came close to abandoning the program. However, for the first time in the state's history, all road interests were supporting a common effort, so the Federation Board of Directors hitched up their belts and made another try in the 1950 spring legislative session. In this, a special session, the Governor could again dictate what subjects the Legislature could consider. The Governor wanted to finance a highway-improvement program by means of an income tax on

(Concluded on next page)

Here's what WE mean by



HD-5
40.26 drawbar hp.
11,250 lb.

HD-9
70 drawbar hp.
18,800 lb.

HD-15
102 drawbar hp.
27,850 lb.

Hydraulic Torque Drive
175 net hp.
41,000 lb.

• DESIGNED FOR YOUR JOB • BUILT TO TAKE IT • EASY TO OPERATE • EASY SERVICE

corporations. This proposal was both contrary to the recommendations of the Federation, and very unpopular with the majority of the members of the Legislature who favored a good-roads program financed by highway users. The Governor would not allow the Legislature to consider a gasoline or weight tax; the Legislature would not consider a corporation profits tax; so once again the program was stymied.

Try No. 4

However, the publicity given to this quarrel focused the public's attention on the need for a highway program. By this time, highway and street agencies,

feeling an even greater pinch for funds and having a better knowledge of the program, rose up in its support. Plans were laid for an all-out fight for the program in the 1951 regular session.

In January, 1951, the Federation's bills were introduced in both houses. But politics raised its ugly head, and it was mid-May before the bills were enacted into law and sent to the Governor for his signature. The Governor vetoed the gasoline-tax increase of 1½ cents.

Success at Last!

The Senate overrode the Governor's veto within 20 minutes after receipt of

his message. The vetoed bills were then rushed to the House of Representatives. Here some difficulties arose, and more politics ensued, but finally, on May 23, the House also overrode the veto, and gave to Michigan the necessary legislation for the entire good-roads program.

It went into effect June 1, 1951. The gasoline tax was increased 1½ cents and the weight tax on commercial vehicles over 4 tons was raised on a graduated scale from 20 to 80 per cent. These measures will bring in about \$30,000,000 additional revenue. The road problem is now out of the hands of the politicians and up to the highway and street administrators.

Improving Unpaved Roads

Roads composed of graded aggregate, ¾-inch maximum to fine, can be improved easily, according to the Calcium Chloride Association, 909 Ring Bldg., Washington 6, D. C. Circular SB-2 entitled "Calcium Chloride for Unpaved Roads" describes proper procedures for using calcium chloride on aggregate-surfaced roads and explains that it will reduce dust, conserve material, lower maintenance costs, and provide an all-weather surface.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 553.



EASY TO SERVICE

- ▶ Allis-Chalmers' new tractor line is blazing the way to simpler servicing with time and money savings never before possible.
- ▶ Adjustments are easier . . . lubrication simplified and lube periods greatly extended. Mechanics say these are the easiest tractors they have ever worked on!
- ▶ This all adds up to less down time, more producing time . . . longer tractor life at less upkeep cost.
- ▶ Below are just a few reasons why this NEWEST, FINEST TRACTOR LINE ON EARTH is *Easy To Service* . . . besides being built to "take it," easy to operate and entirely new in performance. Get the full story from your Allis-Chalmers dealer.





TIME-SAVING LUBRICATION DESIGN—
Only a few lube points, easy to get at — NONE UNDER TRACTORS. You operate 75 HOURS without any greasing — then only one fitting to hit and an oil change to make. (Only exception, torque converter bearings on HD-20). You lubricate the Positive-Seal truck wheels, support rollers and idlers only once every 1,000 HOURS!

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brakes, master clutch, steering clutches. No floor plates to remove for any adjustments. Tracks easier to adjust — simple screw adjustment with automatic lock.

EASY TO REPAIR—
Engine, master clutch, transmission, steering clutches and final drives can be easily removed and repaired or replaced, without disturbing adjacent assemblies.

The Newest, Finest Tractor Line on Earth!

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TRACTOR DIVISION • MILWAUKEE 1. U. S. A.

Torque Drive
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• EASY SERVICE

History of Machines Used in Earth-Moving

A new and colorful treatment has been given to the history of machines used in earth-moving. "Tools of the Earthmover—Yesterday and Today" is authored by J. L. Allhands, Dallas contractor, and is the fourth book he has written. Illustrated with over 400 photographs and drawings, it traces the development of machines from the early days of primitive man to the present time.

Photos of the original Fresno scraper, the Otis steam shovel, the Baker-Maney wheeler, and the old Best tractors will bring back fond memories for old-timers in the earth-moving game. Younger men will be amazed all over again at the mechanization that has taken place in the past half century.

With a lifetime of experience in the earth-moving industry, Mr. Allhands has had exceptional opportunity to obtain first-hand facts and figures for compiling such a volume. He has more than fulfilled his purpose: "to enlighten and at the same time make earth-movers proud of their vocation."

The book may be obtained from the author, 610 Southwestern Life Bldg., Dallas, Texas, or the Sam Houston State Teachers College, Huntsville, Texas. The price is \$5.00 a copy.

Reversible Snowplow

Three models of a new reversible trip-blade snowplow have been introduced by Frink Sno-Plows, Inc., 205 Webb St., Clayton, N. Y. They may be used on trucks with capacities of 1½, 2 to 4, and 5 to 10 tons.

The reversible Sno-Plow is different from the standard trip-blade plow. The drive-frame assembly is pivot-connected to a conical semicircle which permits the moldboard to follow road surface without imposing twisting strains on the truck chassis. Four different right or left plowing angles are available, in addition to one of zero degree for bulldozing.

The preloaded trip spring with moldboard linkage maintains a constant pressure during the entire tripping cycle and prevents chatter at the cutting edge. This trip mechanism is enclosed in the conical semicircle. After passing an obstruction it quickly returns the moldboard to working position without jumping up and losing



The drive frame of Frink's reversible trip-blade snowplow is pivot-connected to a conical semicircle which permits the moldboard to follow road surfaces without imposing twisting strains on the truck chassis.

snow at the ground line. The moldboard is adaptable to plowing or scraping positions. The new plow can be in-

terchanged with other Frink plows using the same truck attachments.

Further information may be secured

from the company by requesting Bulletin 51FA. Or use the Request Card at page 16. Circle No. 610.

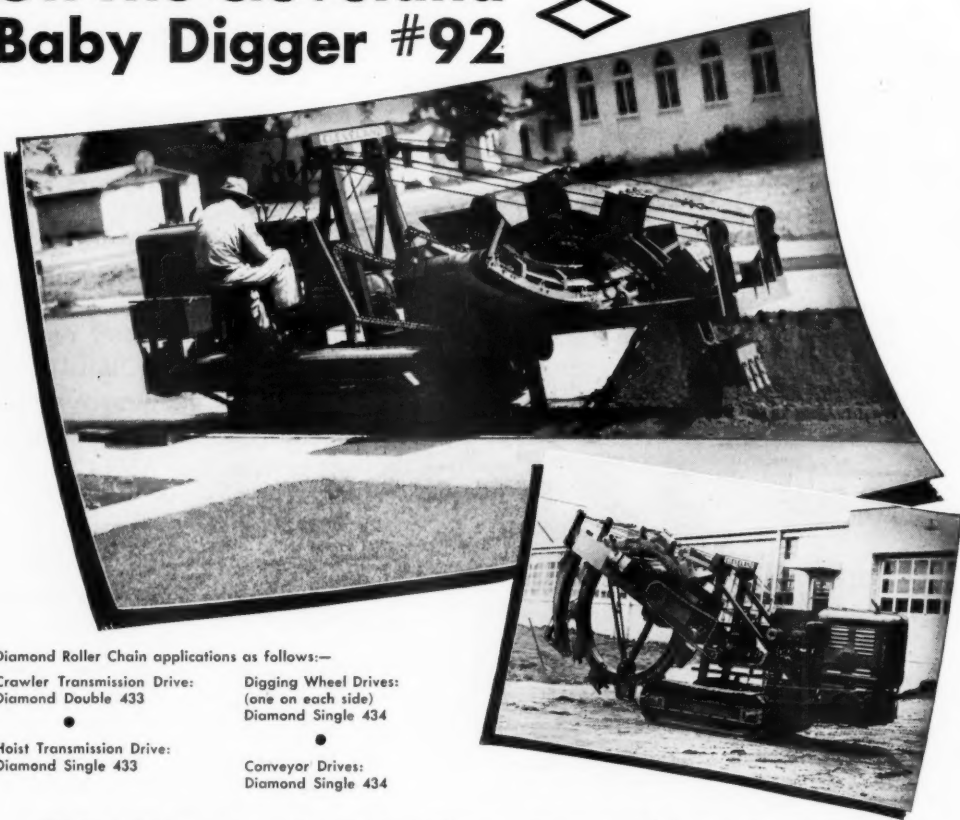
Retirement and Appointment In Virginia Testing Division

July saw a change in the personnel of the Virginia Department of Highways. Shreve Clark retired as Testing Engineer after 31 years of service, and A. B. Cornthwaite, Assistant Testing Engineer since 1946, took over.

Mr. Clark started the Virginia testing division in 1920 at Virginia Polytechnic Institute where he was a professor of highway engineering. He is an honorary member and a past chairman of Committee D-4 of the American Society for Testing Materials.

Mr. Cornthwaite joined the Highway Department in 1929 following his graduation from De Pauw University in Indiana. In his new post he will have charge of testing all materials used in the construction and maintenance of the state's 48,000 miles of highway.

DIAMOND Roller Chain Drives On The Cleveland Baby Digger #92



Diamond Roller Chain applications as follows:—

Crawler Transmission Drive:
Diamond Double 433

Digging Wheel Drives:
(one on each side)
Diamond Single 434

Hoist Transmission Drive:
Diamond Single 433

Conveyor Drives:
Diamond Single 434

Help Maintain the "On Time-Every Time" Operation

● Trench production requires long-time fast operation with strength, power and reliability in every part of the machine.

Cleveland's No. 92 Baby Digger is a compact, tough trencher with power transfer provided by high strength Diamond Roller Chains. These drives include the crawler transmission, hoist transmission—digging wheel and conveyor drives.

Since the development of modern construction and excavating equipment, Diamond Roller

Chains have been widely preferred because of the uniformity of quality, proven long-life performance and the great reserve strength that add so much to economical performance, low cost high yardage and output.

DIAMOND CHAIN COMPANY, Inc.
Dept. 487, 402 Kentucky Ave., Indianapolis 7, Indiana

Offices and Distributors in All Principal Cities

Refer to the classified section of your local telephone directory under the heading CHAINS or CHAINS-ROLLER

THE ANSWER TO THE ENGINEER'S PRAYER

BREAKS
CONCRETE
FASTER

TAMPS BACKFILL
BETTER AND FASTER
FOR LESS



THE NEW, MORE POWERFUL MIGHTY "B" MIDGET

Fastest Pneumatic Concrete Breaker and Backfill Tamper. Replaces all the dirt removed after pipe has been laid. Gives you high density compaction. Ready to repave immediately. No temporary paving. No spoil dirt to haul away. Due to high density compaction, requires little asphalt in replacement. Cuts cost of tamping and breaking of concrete many times. Can be worked manually or automatically. 160' Compressor for full capacity or 105' Compressor for ½ capacity. For further particulars, see your nearest dealer, or write Department C.

R. P. B. CORPORATION

2751 East 11th Street Los Angeles 23, California



DIAMOND



**ROLLER
CHAINS**





One man can carry a sheet of Granco corrugated roof deck. It comes in lengths up to 14 feet 4 inches.

Corrugated Sheets For Roof-Deck Use

A new roof deck manufactured by corrugator methods has been introduced by Granco Steel Products Co., Madison, Ill. It is available in lengths up to 14 feet 4 inches.

The wide-cover feature of Granco roof deck, developed for use on industrial buildings, means the total number of side laps is decreased. The company points out that erection labor is therefore decreased because each Granco sheet handled covers up to 35 square feet. In many instances, this is 50 per cent more than conventional deck. Another feature, the company says, is the corrugator method of manufacture which insures a high degree of pattern uniformity. The rib depth of the deck is the same thickness as a nominal 2 x 4, giving maximum flexibility for architectural design. Baked-on rust-inhibitive paint serves as a primer or a permanent finish, and has high reflection qualities.

Other Granco products are Corruform, a permanent base for thin concrete slabs in steel-joist construction, and Cofar, a deep-corrugated tough-temper galvanized steel with welded anchorage and temperature reinforcement, used as form and reinforcement for long spans of concrete slabs.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 620.

Small Fire Extinguisher

A 4-pound dry-chemical fire extinguisher with a rubber hose has been introduced by Ansul Chemical Co., Marinette, Wis. Its features are ease of operation, flexibility in fighting overhead and ground-level fires, and maximum effectiveness for inexperienced operators, the manufacturer says. Discharge time has been increased on this model, giving untrained personnel more time to extinguish the fire. Operating range of the Ansul 4-B extinguisher is 12 to 15 feet. It has received a B2, C2 rating from Underwriters' Laboratories.

Dry chemical is ejected from the Ansul 4-B through a self-closing nozzle which produces the fan-shaped stream pattern characteristic of Ansul hand extinguishers. The extinguisher is pressurized by a 1½-ounce carbon dioxide cylinder in the dry chemical chamber. The self-closing nozzle makes the new unit weather-tight.

The extinguisher is 19 inches high, 5¼ inches wide and 5½ inches deep. Capacity is 4 pounds of dry chemical. Hose assembly is 15¼ inches long. Each unit is subjected to a 600-psi hydrostatic test.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 680.

Gallions to Be Built in England

Galion (Great Britain) Ltd., Wakefield, Yorks., a subsidiary of Galion Iron Works & Mfg. Co., Galion, Ohio, will begin production of the Galion 118 motor grader late this year. With the exception of the engine, the graders built in England will be the same as those built in the U. S. The British

model will use the Leyland 100-hp diesel engine.

General sales policy and export shipments from American and British factories will be controlled from the Galion, Ohio, office. Mr. Howard L. Glenn, who has been Export Manager for many years, has been named Director of Foreign Operations.

Pneumatic-Tool Catalog

A 12-page bulletin featuring the Atlantic line of tools for pneumatic hammers is available from Atlantic Steel Corp., 1775 Broadway, New York 19, N. Y. Tools in the line include moil points, chisel points, asphalt cutters, digging chisels, rock breakers, pipe drivers, drill steels, drill rods, and chisel blanks. Also featured are hand chisels and hand bars. The booklet illustrates and describes each tool, and gives sizes, weights, and other specifications.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 575.

At DIGGING and LOADING — It's a PIPPIN!



The PIPPIN EXCAVATOR — a combination digger and loader attachment for Ford and Ferguson tractors —

- Back hoes, front hoes, shovels and loads
- Converts from back to front hoe in five minutes
- Digs 7' deep. Back hoe buckets available from 15" wide to 37" wide.
- Bucket capacity 1/5-yd.
- Bucket elevates to 14' above grade
- Load swings laterally to 110 degrees

For greater work capacity and lower costs, get a PIPPIN!

WRITE FOR CIRCULAR

PIPPIN CONSTRUCTION EQUIPMENT CO., Inc., White River Junction, Vt.

Greater protection for heavy-duty engines with ...

New and better ...



Take a close look at the pistons shown in these unretouched photographs. They give graphic evidence of the superior protection new STANOLUBE HD-M Motor Oil offers in automotive diesel and heavy-duty gasoline engines.

The larger of the two pistons was taken from a diesel test engine after 480 hours operation (the Caterpillar No. 1-A Test) and shows clean, deposit-free ring grooves. The smaller was removed after test in a gasoline engine (the Chevrolet 36-hour Test) and reveals no varnish-like deposits on the piston skirt.

Here's graphic proof of two important properties of this new motor oil: improved detergent-dispersant action and greater oxidation stability. These two properties, proved by laboratory tests and confirmed in extensive field service, mean superior protection under the most severe conditions of high operating temperatures and prolonged periods of operation.

New STANOLUBE HD-M Motor Oil offers these two properties in addition to the same qualities of corrosion resistance and freedom from foaming which helped make STANOLUBE HD a preferred lubricant for heavy-duty applications during the past nine years. To make the best use of this new and better motor oil, ask for the services of the Standard Oil lubrication specialist in your area. Phone your local Standard Oil Company (Indiana) office or write Standard Oil Company (Indiana), 910 South Michigan Ave., Chicago 80, Illinois.



A Complete Line of Motor Oils for Every Heavy-Duty Service Need

STANOLUBE HD-M is recommended for all internal combustion engines. It meets U. S. Army specification MIL-0-2104. This lubricant provides excellent cleanliness, low wear rate, and low oil consumption under severe operating conditions. Available in all SAE grades.

STANOLUBE S-1 is recommended for use in automotive, diesel, or gasoline engines where other heavy-duty oils cannot control deposits caused by operational severity or adverse fuel quality. It meets requirements of MIL-0-2104 and the requirements for "series 1" type oils as well. Available in all SAE grades.

STANOLUBE HLA is recommended for use in super-charged diesel engines and in other engines that operate under the most adverse conditions. It meets the requirements of MIL-0-2104 and the requirements of "series 2" type oils. Available in SAE 10 and 30 grades.



STANDARD OIL COMPANY (INDIANA)

A Half-Mile Tunnel Completes Sewer Lines

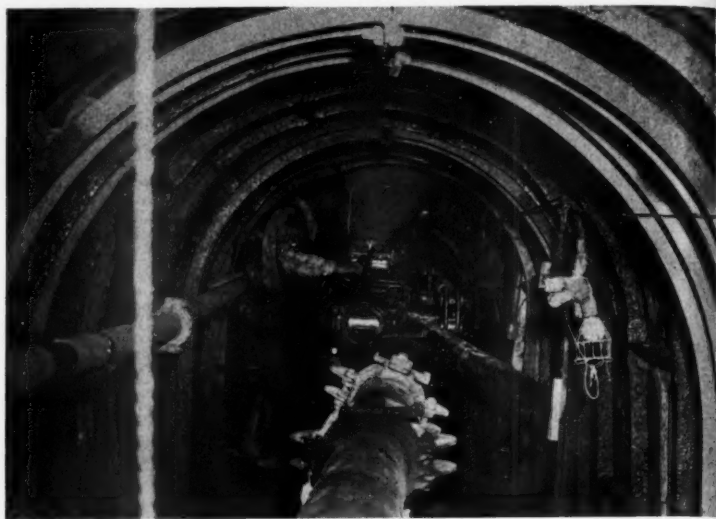
Small Size and Running Soils on Sewer Main Construction Pose Back-Breaking Tunneling Job for the Contractor

By MICHAEL A. SPRONCK,
Associate Editor

• IT'S a small job, but a tough one, that Curly Construction Co. is doing for the Bergen County Sewer Authority. The company has the tunnel sub-contract on Section 18 of the main sewer trunk line which leads down to the new sewage-treatment plant in Little Ferry, N. J. (See C. & E. M., May, pg. 64.) The tunnel's small size—5½ x 4 feet—makes it a tough job all the way through. Moving men, materials, and

equipment in and out; getting rid of rock dust; and, most important, getting out from under when the ground starts to run—these are problems that have to be coped with every inch of the way.

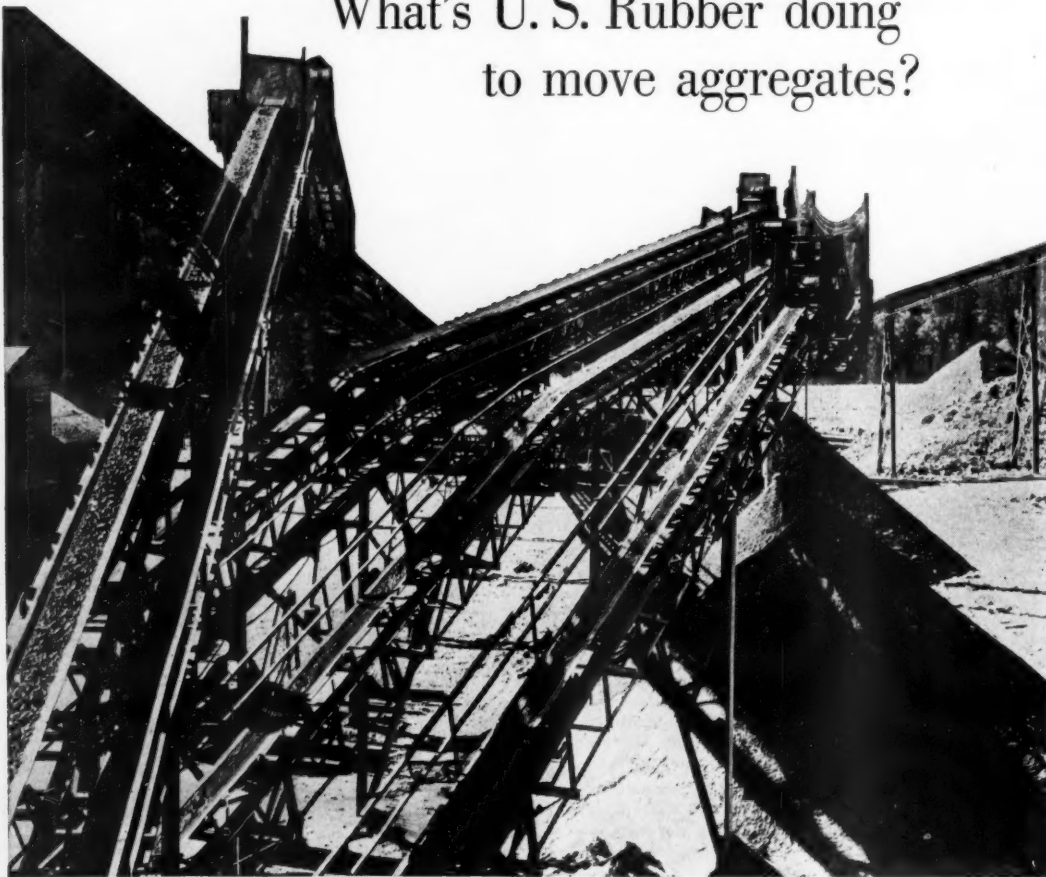
The tunnel section joins two trench sections and passes through a hill that is 55 feet above grade at the highest point. In plan view the tunnel line has three parts: a center section 1,160 feet long, a 510-foot section turned off at 15 degrees toward the east portal, and a 441-foot section angled 15 degrees toward the west portal. All sec-



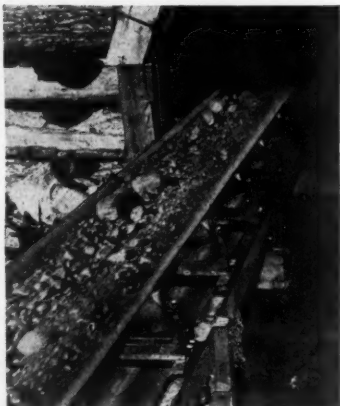
C. & E. M. Photo

In the tunnel shaft at the west portal, a Curly Co. workman lubricates the Rex Pump-concrete. Note the Commercial Shearing liner plates to hold back the running ground.

What's U. S. Rubber doing to move aggregates?



Nearly 3 miles of United States Rubber belting, varying in width from 24" to 42", is used in all the phases of aggregate processing at the Hungry Horse Dam. Above is shown a series of the belts carrying sized materials to the storage piles.



U. S. Rubber engineers worked with the constructors of the dam and the designers of conveyor equipment to produce this highly efficient conveyor system. ALL the belting used to "feed" Hungry Horse Dam was furnished by U. S. Rubber.

NEARLY six million tons of aggregates are being carried to the site of the mammoth Hungry Horse Dam in Montana—all on U. S. Rubber belting. The dam is under the supervision of the U. S. Bureau of Reclamation.

Whenever you have a problem involving materials handling, no matter how big or small, get in touch with our engineers. Write to address below.

PRODUCT OF

U.S. RUBBER
SERVING THROUGH SCIENCE

tions slope on a 1 per cent grade to the east.

Drilling Methods

The contractor's crew started at the east end of the line, digging a deep slit into the ground with backhoe and clamshell. The slit was on a 20-degree slope down to tunnel grade. The excavated material was dumped into waiting trucks for spoil. To save the cost of a setup at each end, the contractor had planned to tunnel the full length from the east end. Running ground, especially bad near the west end, forced a change in plan, however. More about that later.

Drilling was done with Ingersoll-Rand J-50 Jackhammers mounted on a jack leg; an extra hammer was on hand at all times to keep the job moving. The 1-inch hex steel was fitted with Timken carbide detachable bits. The 6-foot round was started with a 2¼-inch bit and finished with a 1¾. Water-pressure drilling helped to cut down the rock dust. Some 18 to 26 holes were made in the face and plugged with Du Pont 40 per cent powder. The face was about 6½ feet high and 6 feet wide. For controlled pull the blaster used a 1 to 7-millisecond delay system.

A Gardner-Denver Model 9 mucker scooped up the pile and loaded to Easton side-dump mine cars. The job was mechanized throughout. As fast as the cut was moved ahead, 24-inch-gage 30-pound rails were set in place. A Mancha Little Tugger battery-powered locomotive pulled six cars at a time to the portal. Here they were picked up by a Gardner-Denver air-tugger hoist and pulled up a 20-degree ramp to waiting trucks. The ramp continued on a level trestle to facilitate quick side dumps into the trucks. Ford trucks with 1½-ton bodies took the rock to a spoil area about a ½ mile away. The empty mine cars were picked up on a side switch by the locomotive and taken back to the face.

Except for the battery-powered locomotive, most of the equipment was air-powered. A Gardner-Denver 315-cfm portable compressor met all requirements on the job. Air was delivered to

For the
Finest in Chain Saw
Performance —
Lombard Model 7 Two
Man Saws with new
Warren High Speed Chain



12% more power
10 lbs. lighter weight

LOMBARD GOVERNOR CORP.
ASHLAND, MASSACHUSETTS

UNITED STATES RUBBER COMPANY
MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.





C. & E. M. Photo

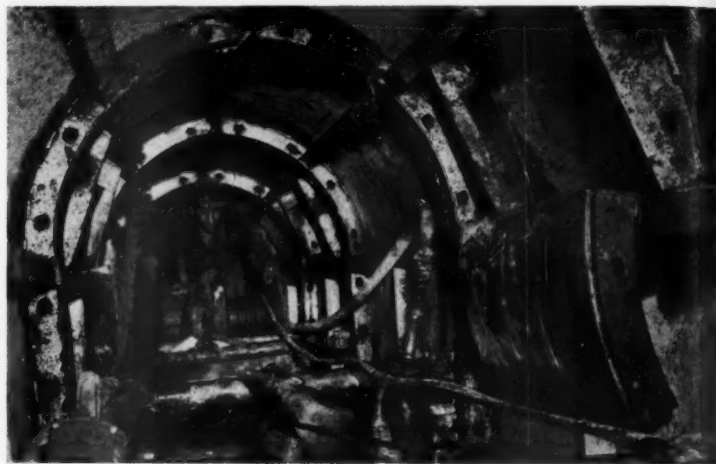
A tunnel concrete pour has set and the specially built Robert Mayo forms are being pulled away. The cable, at right, leading in to the winch set in the forms, is fastened to a deadman driven in the rock; it enables the winch to pull the forms forward.

A Half-Mile Tunnel Completes Sewer Lines

(Continued from preceding page)

and a V-invert with a finished section 4 feet wide x 5½ feet high. Spex require a 6-inch-minimum wall in rock sections and an 8-inch wall in dirt sections. Liner plates had to be kept in place where there was bad ground. A 3,500-pound Type 2 portland cement was used. Transit-mix concrete was delivered by Samuel Braen's Sons of Hackensack in GMC trucks with 6 and 10-yard Rex or Jaeger bodies.

Because of the small size and shape of this tunnel, special steel forms were made up by Robert Mayo. The form was 60 feet long and was supported on two traveling carriages. A series of hydraulic jacks raised the forms from the carriages to the pouring position. Twelve turnbuckles were placed horizontally to hold the form in position against the 8-inch-high curb on each side of the tunnel.



C. & E. M. Photo

Here is a closeup in the sewer tunnel, inside the forms.

The Rex 6-inch clamp-joint delivery pipe was made up in 10-foot sections. Timber slats were set across the rail to support the pipeline. A dozen yards from the forms the pipe went up a jump-over to pump into the tops of the forms. As the concreting moved along, the 10-foot end section was removed and pumping resumed. As each 60-foot section was completed, the form was broken away after final set. The job moved along this way until the pours reached the vertical line at the well hole. Here the Pumpcrete line was reversed, run through the form, and made a 180-degree 5-foot-radius turn up into the top of the form. The remaining 500 feet of the center section was completed in this manner, then the Pumpcrete was moved to the west portal and the line was run in from there.

Beating the Bad Ground

Finishing up the job at the east end, the contractor brought all of his equipment around to the west. Most of the drilling and mucking equipment was sent back to the yard; it wasn't designed to work in the soup that existed in this area. A 10 x 10-foot vertical shaft was sunk a full 20 feet at the west end. The men had to work with pick and shovel in the bad ground. They moved in by inches, battling the running ground and putting up steel liner plates every time they had 12 inches of clear space.

The water continued to run in, varying from 185 to 450 gallons per minute. Three Homelite pumps, two 3-inches and one 2-inch, kept the water out of the men's pockets. Passing back shovel-

(Concluded on next page)

Wagner HYDRAULIC LOADERS

WM3 Hydraulic loader with material bucket Patents and Improvement Patents applied for.



USES MULTIPLY with 15 interchangeable attachments



Coal Bucket Snow Bucket
"V" Snow Plow Concrete Bucket

AVAILABLE FOR:

Ford Ferguson John Deere
Ford-Ferguson "M" Series
Int'l. Harvester Minneapolis-Moline
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Farmall Cub Allis-Chalmers WD
Case VA & VAI-VAC LeRoi-Centaur & Tractor

AND MANY OTHERS

unlimited time & effort savings

You save money when Wagner Loaders take over your material handling problems.

LOW INVESTMENT in a Wagner Loader is quickly written off as it pays for itself in more efficient material handling.

BUSY THE YEAR AROUND Wagner Loaders with 15 interchangeable attachments can be applied to over 50 different material handling problems.

EASY TO USE, the hydraulic double-acting controls put power at your finger-tips for fast precise operation of lifting and operating cylinders.

AND THEY STAY ON THE JOB Wagner loaders are built to withstand years of hard service. They have many outstanding extras in sturdiness that include: precision built gear type oil pump, heavy combination bumper and radiator grill guard, strong tubular structure.

DECIDE NOW to be one of the 35,000 users benefiting from unlimited time and effort savings with the Wagner Loader.

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TRACTOR LOADER

Please send complete information on loader for tractor, model
I am interested as ☐ user; ☐ dealer.
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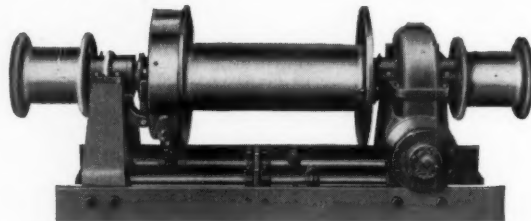
Wagner Iron Works — Dept. 17-3
1905 S. 1st St., Milwaukee 1, Wis.

PULL and POWER

Tulsa Winch models for all trucks from ½-ton up.



Tulsa Winches for all crawler tractors complete with transmission, line roller assembly and mounting brackets ready for installation.



To get the most work from your tractor or truck, install a Tulsa Winch. Available in 28 different models in capacities from 6,000 to 80,000 pounds, there is a Tulsa Winch for every construction job. Get in touch with your nearest Tulsa Winch distributor now or write direct to

*Reg. U. S. Pat. Off.

Tulsa Winch
TULSA, OKLAHOMA DIVISION OF VICKERS Inc.

815-35 E. First Street



C. & E. M. Photo

General Superintendent Wayne Smith uses the phone connected to both tunnel portals.

fuls of the material which was clamshelled up to the surface, the men finally holed through. This entire section was braced with Commercial Shearing liner plates. The forms were then taken into the tunnel and pouring started where the former section had first begun. The Pumpcrete machine was placed in the bottom of the shaft and concrete was poured down through a 12-inch pipe to the Pumpcrete cone hopper.

With all concrete in place, drill holes were set every 100 feet. A Gardner-Denver Model AF-6 grout pump delivered grout under 20-pound pressure to seal the existing leaks and fill the sag above the concrete arch.

Personnel

Fornaby & Ragnonesi of New York and Baltimore, which holds Contract 18 for \$475,000, subbed the tunnel portion of the contract to Curly Construction Co. Wayne Smith was General Superintendent for Curly. Robert A. Lincoln was Resident Engineer for Bogert & Childs Engineering Associates, New York, consultant engineers representing the Bergen County Sewer Authority.

Total Weed Killer

A new weed and grass killer, designed to destroy practically every type of herbaceous plant on which it is sprayed, has been developed by Lion Oil Co., El Dorado, Ark. Lion Herbicidal Oil No. 6 is said to be relatively nontoxic and to offer no danger to livestock, persons, or to gardens, flowers, and ornamental shrubbery adjacent to the areas treated. The chemical is intended for areas that must be free of all vegetation.

Because of regulations forbidding the use of containers for any commodity not using such containers a year ago, Lion Herbicidal Oil No. 6 is available only in tank-car lots.

Further information may be secured from the company. Or use the Request card at page 16. Circle No. 598.

Earl Smith Joins M-C&S

New sales engineer for Merritt-Chapman & Scott Corp. is Earl C. Smith, active for the past 25 years in the design, construction, and operation

of chemical plants and oil refineries.

Mr. Smith, who most recently was associated with Brown & Root, Inc., of Houston, Texas, will work under Myles C. McGough, Vice President in charge of the company's Industrial and Building Construction Division.

Bituminous Spreader

A bituminous spreader of comparatively simple and inexpensive type has been engineered by The Burch Corp., Crestline, Ohio. It can be used with any dump truck, taking the material directly from the truck body into the machine hopper and down to the feed gate. The feed gate and strike-off blade have independent adjustment for close control of the quantity and thickness of material laid. The feed gate is adjustable for spreads from 0 to 8 inches.

The spreader is designed for a laying width of 10 feet. Cutoff plates are available to narrow this width. Burch points out that hand steering permits a



The Burch bituminous spreader can be used with any dump truck. It takes material directly from the truck body into the machine hopper and down to the feed gate.

turn 30 degrees to the left or right of center line. The truck hitch is furnished with the machine and is adjustable for height. The company reports that this unit will lay any type of asphaltic

material on new construction or resurfacing work.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 641.

B.F. Goodrich



Pick your toughest hauling job—hand it to these tires

ROSCOE KREAGER, Supt., right above, watches a loading operation at the quarry of the Woodville Lime Products Company at Woodville, Ohio. Here, Mr. Kreager sees a giant crane dump a bucket of limestone into a trailer equipped with B. F. Goodrich Universals. This is a year-round operation at Woodville as the company processes limestone, fertilizers and other kindred products for nation-wide sales.

Some thirty vehicles are used by this company for intraplant stone hauling. According to Kreager, BFG Universals are used on all of these vehicles, and the company is well pleased with the

performance of the B. F. Goodrich tires on these vehicles. Subjected to exceptionally hard wear, they travel over stone and razor-sharp rocks with equal traction in forward or reverse gears because they are nondirectional!

B. F. Goodrich Universal tires were selected on the basis of service and quality. These tires have greater bruise resistance and greater ability to absorb and withstand shocks because they're built with the patented nylon shock shield. Strong, protective layers of nylon are built in between the tread rubber and the cord body of all BFG tires of 8 or more plies . . . and at no

additional cost to you.

There's a special B. F. Goodrich tire for every off-the-road service. See your local dealer. Let him help you get the benefits of longer tire life and lower operating overhead. The B. F. Goodrich Company, Akron, Ohio.



Make your
UNDERWATER
SURVEYS
easier...
with a BLUDWORTH
DEPTH RECORDER
Write: BLUDWORTH MARINE 92 Gold St., New York



An automatic oiler, an automatic clutch, and a recoil starter are features of the Wizard 27-pound 16-inch chain saw. One man can operate it.

A 16-Inch Chain Saw

A 16-inch gasoline-powered chain saw has been announced by Lombard Governor Corp., Ashland, Mass. The Wizard weighs 27 pounds and can be operated by one man.

It features an automatic oiler, automatic clutch, and a recoil starter. Close-to-ground cutting and two-position handling make it suitable for cutting and limbing trees. The engine has a one-piece crankshaft, needle-bearing forged-steel connecting rods, and heavy-duty ball bearings at both ends

of the shaft.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 584.

Hydraulic Puller Bulletin

A new 8-page bulletin on the Power-Twin hydraulic puller is available from the Owatonna Tool Co., 381 N. Cedar St., Owatonna, Minn. The Power-Twin has a capacity of 17½ tons and weighs 10 pounds.

The bulletin completely describes the Power-Twin and its center hole feature which is adapted to all OTC pulling systems now in use. It illustrates time-saving methods for installing and removing cylinder sleeves, shafts, gears, wheels, and other usages. It also shows conversion sets, new bench presses, and the Hydratote which provides portable storage for all parts plus a sturdy press.

This literature may be obtained from the company by requesting Bulletin OTC, or by using the Request Card at page 16. Circle No. 690.



A single-strand-chain drum drive, drop-forged flame-hardened drum rollers, and a lighter, stronger frame are among the new improvements built into Rex horizontal Moto-Mixers.

Horizontal Mixers Get New Improvements

A number of improvements have been incorporated in the horizontal Moto-Mixers manufactured by Chain Belt Co., 1666 W. Bruce St., Milwaukee, Wis. These units are made in three sizes with maximum capacities of 3, 4½, and 5½ cubic yards.

A single-strand-chain drum drive is reputed to improve over-all efficiency and reduce maintenance. The mixers are now equipped with drop-forged flame-hardened drum rollers. The water pump has been relocated for easier replacement and adjustment. Spouting equipment has been redesigned for increased flexibility. Use of alloy metals and improvements in fabrication methods have produced a

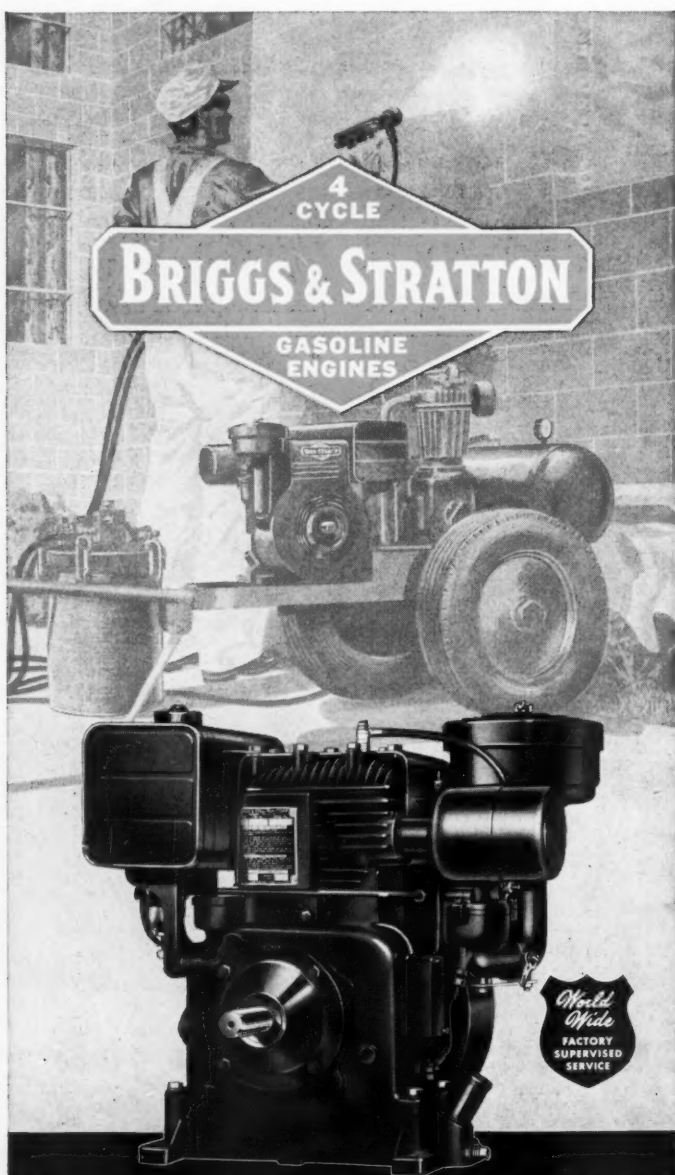
lighter but stronger frame, the company says.

Complete data on the improved horizontal and Adjusta-Hite mixers may be obtained from the company by requesting Bulletin No. 51-29. Or use the Request Card at page 16. Circle No. 666.

V. P. of Watson-Stillman Dies

Alfred G. York, a director and vice president of Watson-Stillman Co., died last July after a prolonged illness. He had been with the Roselle, N. J., company since 1918, as Assistant Treasurer, Assistant to the President, and then General Sales Manager.

Upon his election to the Board of Directors in 1945 he took full charge of the Distributor Products Division of the company.



Preferred power on portable paint-sprayers — one of many hundreds of applications on machines, tools, appliances for industry, construction, railroads, oil-fields, and on equipment and appliances for farm and home.

THE sure way to get the best in air-cooled power — insist on Briggs & Stratton, the recognized leader. No other single-cylinder, 4-cycle, air-cooled engines are so universally preferred by manufacturers, dealers and users alike.

Briggs & Stratton Corporation,
Milwaukee 1, Wisconsin, U. S. A.

In the automotive field Briggs & Stratton is the recognized leader and world's largest producer of locks, keys and related equipment.



• During these days of uncertain deliveries, many trucks, bodies and hoists are carrying heavier-than-usual work-loads . . . under conditions that place extra stress and wear on valuable equipment.

More and more, truck owners are benefiting from efficient, dependable—more profitable dumping service . . . through regular maintenance and prompt repair of existing equipment.

Your near-by Marion distributor can furnish genuine Marion parts and factory "know-how" for all of your service and repair requirements.

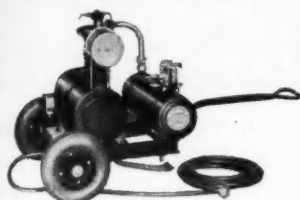
For the LIFE of your Marion, see your friendly Marion distributor . . . today.

MARION
BODIES AND HOISTS

MARION METAL PRODUCTS CO.

Marion, Ohio, U. S. A.

Standard and Special Hoists and Dump Bodies for Heavy-Duty Service



The Lindsay Model 5 electric-powered compressor is designed for use with tools and spraying equipment in confined areas. Its air delivery is 5 cfm at 60-pound pressure.

An Electric-Powered 5-CFM Air Compressor

A new electric-motor-driven compressor for use in confined areas, where gasoline - engine - driven compressors cannot be used, is manufactured by P. K. Lindsay Co., 97 Tilestone St., Everett 49, Mass. It has an actual air delivery of 5 cfm at 60-pound pressure.

A 1-hp repulsion-induction motor, plus such features as a thermal-overload protection switch and automatic unloading, permits this compressor to operate from a 110-volt lighting circuit. It will produce enough air to operate spray-painting equipment and $\frac{3}{4}$ or 1-inch pneumatic utility tools, the company says. The Model 5 compressor is mounted on semipneumatic rubber-tired wheels so that it may be easily moved about or pulled up a flight of stairs by one man.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 580.

Backripping as Aid To Bulldozing Work

The principles of backripping, a new approach to earth-moving with a bulldozer, are described and illustrated in literature recently prepared by Preco Inc., 6300 E. Slauson Ave., Los Angeles 22, Calif. The Preco Back-Rip scarifier is designed for mounting on most straight-blade bulldozers. These units rip the ground while the tractor is backing up in preparation for the next forward blading operation. The rippers loosen the soil for easier blading by ripping out rocks, roots, and hard ground. This, the company says, enables moving the loose material to the full capacity of the blade.

One of the available bulletins explains in detail how Back-Rip scarifiers work. The four curved shanks are capped with lock-on teeth which pivot from housings. The housings are installed on the back of the bulldozer moldboard. The teeth cut (approximately 9 inches deep) only when the tractor is backing up. When it moves forward, the teeth drag freely on top of the ground. They are entirely automatic—there are no extra controls. Each tooth can be independently pinned up out of the way if desired.

On-the-job action photographs illustrate the application of these units on pioneer roads, hard rocky ground, land and right-of-way clearing, removing blacktop, loading scrapers, and other everyday construction jobs.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 692.

A 3 to 5-Ton Tandem Roller

A catalog on the new Galion 3 to 5-ton variable-weight tandem roller has been issued by The Galion Iron Works & Mfg. Co., Galion, Ohio. Improvements in construction and operation are fully described and illustrated. Among the new features are hydraulic steering, spur-gear final drive with machine-cut alloy-steel gears, constant-mesh transmission, and a pneumatic-tired towing attachment (available as an extra). Complete specifications are listed.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 552.

Keystone-Asphalt Personnel

Two promotions in sales management are announced by Keystone Asphalt Products Co., a division of the American-Marietta Co., Chicago, Ill. W. E. Hagemaster is named Assistant Sales Manager, and W. H. Riddell succeeds him as Assistant to the Sales Manager.

SOLVE YOUR HAULING PROBLEMS WITH A "TRANSPORT TRAILER"

Capacities through 75 Ton—Semi and Full Trailers



CARGO CARRIER MODEL GPX (Semi) with Tandem Axles

PATENTED TANDEM AXLE ASSEMBLY—Featuring unusual lengthwise and side-wise wheel accommodation to irregularities in the road. Use of full width tubular forged, heat treated axles with CAMBER.

FRAME—Constructed of beam sections throughout, electric welded. A ruggedly strong and efficient unit with minimum weight.

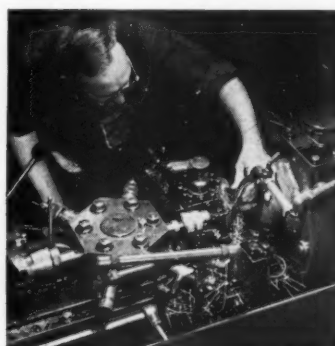
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CARRY HEAVY LOADS? If you need top load capacity in bearings, Timken® roller bearings can give it to you. Due to line contact between rollers and races, Timken bearings have extra load capacity—one big reason why they're used in the sheaves of the heavy-duty shovel above.

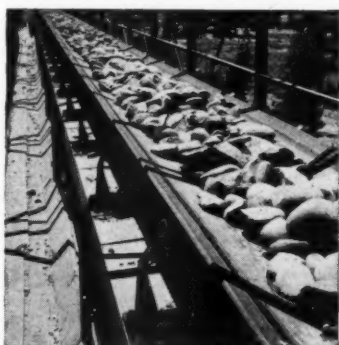


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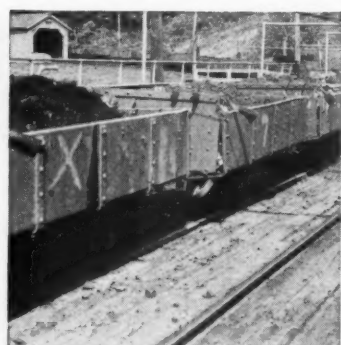


TAKE COMBINATION LOADS? Because Timken bearings are tapered, they take both radial and thrust loads. Auxiliary thrust bearings or plates are eliminated. Wheels of the grader above are an example of where Timken bearings carry both radial and thrust loads.

TIMKEN® bearings do it!



CUT MAINTENANCE COSTS? Timken bearings permit use of closures which keep lubricant in—dirt and moisture out. Maintenance and lubrication time are minimized. Belt conveyors are an important example of the many types of equipment where Timken bearings have helped cut maintenance costs.



MINIMIZE FRICTION? What makes these mine cars easier starting? Timken bearings on the axles. Due to true rolling motion and smooth surface finish, Timken bearings minimize friction. And Timken bearings stay friction-free because their case-carburized rollers and races resist wear.



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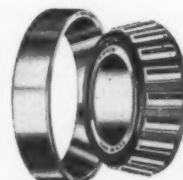


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Be sure to specify Timken roller bearings for the machines you make or use. Look for the trademark "Timken" on the bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

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Long Earth Dam in Alabama

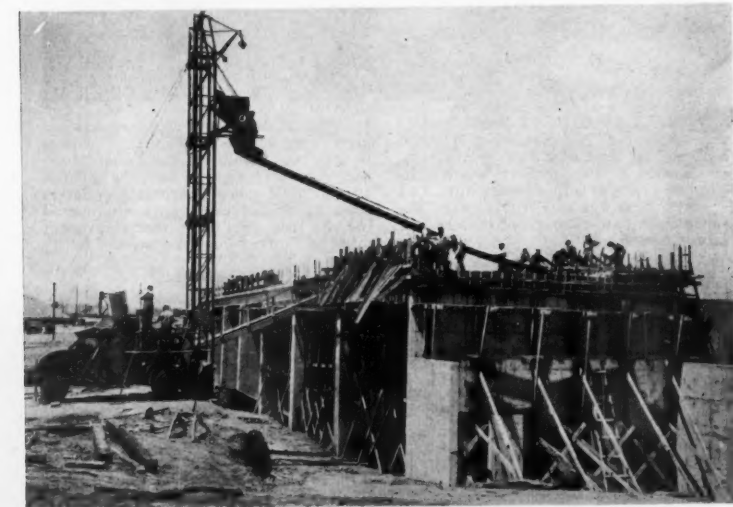


Nineteen miles from Mobile, Ala., is the Big Creek Water Supply Project. At the left is Big Creek, with a work bridge over it along the axis of the dam, and a few hundred feet east is the diversion structure Ewin Engineering Corp. built.



Ewin also built the concrete spillway shown here. At the right is the batch plant.

(C. & E. M. and Ewin Engineering Corp. Photos)



A Mixernobile places spillway concrete via a chute from its tower skip.



The last 34-foot deck slab goes in the spillway. Those are Jackson vibrators you see.

Seventy-Foot Steel Sheet Piling Driven, Jetted in Hard Clay; Dam Will Impound Reservoir For City Water Supply

By WILLIAM H. QUIRK,
Eastern Editor

• DAMS are usually constructed up along the headwaters of rivers and tributaries, or at least well back from the mouths of water courses. But in the search for additional water supply for Mobile, Ala., major seaport on the Gulf of Mexico, engineers selected a dam site on the coastal plain only 19 miles from the city. Such a location will be an economical asset because of the minimum length of transmission main required to pipe raw water into Mobile. Advantage was taken of topography at the site to include high points of ground within the structure of the dam.

From the west end to the center of spillway at the eastern extremity, the dam measures 6,600 feet across the watershed of Big Creek. It is a compacted-earth embankment with a maximum height of 77 feet and a maximum base width of 400 feet at the creek. For the central 2,400 feet of its length, there is a steel-sheet-pile cutoff wall with sections up to 70 feet long. The 235-foot reinforced-concrete spillway contains seven taintor gates, 10 feet

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16 years

CHEM-
624 EVI

Has a Sheet-Pile Cutoff Wall

high x 31 feet and weighing 11 tons each. Together they have a maximum discharge capacity of 35,000 cubic feet per second.

J. B. Converse & Co., Inc., consulting engineer of Mobile, designed the Big Creek Water Supply Project for the Mobile Water Works Board, and is supervising all construction. A contract for the building of the dam was awarded to L. L. Jarrell of Whistler, Ala., on a low bid of \$1,362,947. The major part of the work, amounting to around \$900,000 and including the spillway, cutoff wall, diversion structure, and slope paving, was subbed to the Ewin Engineering Corp. of Mobile, with the prime contractor handling the earthwork. Construction got under way in August, 1950, and is expected to be completed by the end of this year.

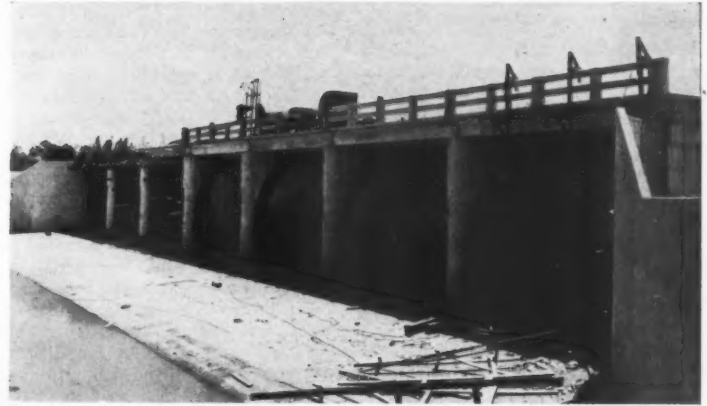
Diversion Structure

After the site was cleared, the topsoil was stripped from the sand and clay foundation and stockpiled for use later on the slopes of the dam. Ewin Engineering Corp. at once got started on the diversion structure, a double 8 x 8-foot reinforced-concrete culvert 400 feet long, built a few hundred feet east of Big Creek in an open cut. A work bridge was erected over the creek to permit the movement of earth-hauling equipment until the culvert was completed and the creek diverted through the structure.

To build the 1,600-yard concrete culvert, Ewin set up a batch plant right at the site and dry-batched the cement, sand, and gravel to a Koehring 27-E paver and a 1-yard Mixermobile. Later the entire setup was shifted to the east end of the project for the construction of the spillway. At the culvert, water for the mix was pumped directly from the creek. For the spillway pours, a 4-inch well was driven to a 300-foot depth, and the water was pumped into a 17,000-gallon storage tank by a Fairbanks-Morse 4-inch gas-driven pump. From the tank a Jaeger 3-inch centrifugal pump sent the water to the spillway area through a 4-inch distribution line which was tapped with 2-inch feeder pipelines to the mixers.

The Richton Sand & Gravel Co. of Richton, Miss., furnished the aggregate which was shipped in hopper-bottom cars to a leased siding of the Gulf, Mobile & Ohio Railroad at Orchard, Ala. An under-the-car conveyor unloaded the material into trucks which hauled the sand and gravel 11 miles to stockpiles at the plant. A Lorain TL-20 crawler crane with a 50-foot boom and a 3/4-yard clamshell bucket charged the Blaw-Knox 100-ton aggregate bin. Ideal bag cement was shipped to the site by rail and truck over the same route from Mobile.

(Continued on next page)



C. & E. M. Photos

The Lorain crane at left sets an 8 1/2-ton section of taintor gate in the spillway. Above, four of the gates are now in place, their tops at elevation 110.

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Men

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CUBIC YARDS

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Earth Dam in Alabama Has Pile Cutoff Wall

(Continued from preceding page)

Wooden Forms

Forms were built of 3/4-inch plywood backed with 2 x 6 studs on 12-inch centers, and double 2 x 6 wales spaced according to the varied pressure of the concrete. Medco clevis-type snap ties of 5,000-pound strength were used to hold the forms together. Concrete Steel Co. of Birmingham, Ala., supplied all reinforcing steel, which was delivered to the job by truck. Up to five trucks, carrying two 1-yard batches, picked up sand and gravel under the aggregate bin, collected cement at the storage shed and platform, and hauled the materials to the mixers.

Both the paver and Mixermobile were used on the larger pours, while the Mixermobile was used alone on the walls and deck pours of the spillway. Used with 40 and 60-foot towers, the Mixermobile eliminated the need for a crane. With a 40-foot chute from the tower skip, the use of wheelbarrows or buggies in distributing the concrete to the forms was also unnecessary. As the concrete was placed it was vibrated with Jackson vibrators. Water served for curing.

Early last April the diversion structure was completed, intake and outlet channels were dug back to the creek, and the water was diverted through the new culvert. The construction bridge for the earth-moving equipment was removed from the former creek bed. This fall, as the dam nears completion, the diversion culvert will be closed with a concrete plug.

Sheet-Pile Cutoff Wall

The sandy upper stratum throughout the reservoir area and dam site made necessary the steel-sheet-pile cutoff wall to prevent loss of impounded water downstream. M-115 sections weighing 36 pounds to the foot were loaded on barges at the U. S. Steel Co. plant in Pittsburgh, Pa., and shipped by water via the Ohio and Mississippi Rivers, the Gulf of Mexico, and the Mobile River to a dock near Chickasaw, Ala. There they were loaded onto pole trailer trucks, and hauled with 12 to 15 tons a load 26 miles to the job site.

Of the 1,350 sections required, 640 pieces across the low central part of the valley were 70 feet in length. Another 184 members were 65 feet long, while the remainder ranged from 45 to 60 feet in length. Shorter lengths were used at the ends of the wall where the impervious material into which the sheeting was driven was at a lesser depth than in the center. The sheeting, driven into the deep stratum of impervious clay, practically sealed off the plain of the creek valley.

Driving the long, heavy sheeting into the unyielding clay was not easy. Because of the uneven terrain, two crawler rigs were selected for the driving—a P&H 1 1/2-yard crane with a 95-foot boom and a Lorain 2-yard machine with a 125-foot boom. Two 80-hp boilers furnished steam for the driving—an American vertical-type and a Cleaver-Brooks steam generator. Driving started on October 25, 1950, with a driver at each end, and continued through the winter until the sheeting was completed on April 11, 1951. A gap was left in the line at the creek until the diversion structure was finished. No difficulties were encountered at the two connections made in the 2,400-foot wall; at each point the adjoining sections fitted together without trouble.

Drive and Jet

The usual procedure in driving was to set up a series of 50 sheets in a row and tap them into the ground with a McKiernan-Terry 9B3 hammer. The hammer was equipped with fishplates, but no leads were used at this point.

Then each section was jetted and driven 20 to 25 feet into the ground. A switch in hammers was then made to a Vulcan No. 1 for the remainder of the driving, using swinging steel leads 40 feet in length. Jetting was also used at this stage until the final grade was nearly reached. Because of the great skin friction encountered in the deep clay stratum, this material was kept in suspension by the jets until the last 5 feet of penetration.

Each driver was equipped with a pair of jets. A Griffin jet pump, 1,500-gpm at 350-pound pressure, supplied water to one rig. Driven by two GM diesel engines, 330-hp at 1,800-rpm, the pump was set up on a pile foundation at the edge of the creek. Water from this unit was pumped a maximum distance of 1,500 feet through a 6-inch lightweight welded steel pipe. At the driver the 6-inch pipe fed two 4-inch jet lines that reduced to 1 1/2-inch nozzles.

For the other drive a Goulds 4-inch pump, 150-pound pressure, was set up at the creek to pump water through a

4-inch standard-threaded steel pipeline. This line had a maximum length of 1,700 feet and required a booster—an Aurora 4-inch pump at 125-pound pressure. The 4-inch line split up at the driver into a pair of 2-inch jets that reduced to 1 1/4-inch nozzles. Pressure at the jets was at least 200 psi. As the line of piling came nearer to the creek, the water supply, the booster pump on the 4-inch line was cut out. An international TD-14 tractor snaked the sheet piles over the ground to the drivers.

Concrete Spillway

Along with the pile driving, Ewin was working on the concrete spillway which was completed early in May. It contains 3,000 yards of concrete out of a 14,000-yard total for the project. The spillway structure is supported on a base slab 250 feet long x 35 feet wide x 3 feet thick, with a sheet-pile cutoff wall along the north or reservoir side. Piers supporting the superstructure are 3 feet thick and 24 feet high. The 6 1/4-inch deck slab includes a 24-foot road-

way which is flanked by a 2-foot curb on the downstream side, and an 8-foot sidewalk on the upstream side.

The Virginia Bridge Co. of Birmingham, Ala., supplied the seven tainter gates that were installed between April 1 and the middle of May. A Lorain crane with a 100-foot boom set the gates, using a two-part line to lift sections weighing 8 1/2 tons. The tops of the gates are at elevation 110.0, permitting control of the reservoir level between 100.0 and 110.0 elevation. Gates will be used only during periods of excessive rainfall. The seven 34-foot slabs for the highway deck are at elevation 125.0, or 3 feet higher than the dam itself.

From the downstream side, the spillway discharge extends 1,121 feet with a width decreasing from 235 to 90 feet. It is paved with a concrete slab 12 inches thick that is increased to 24 inches at the hydraulic jump section, and to 36 inches in the stilling-basin area. Concrete walls along the discharge structure are 12 to 25 feet high.

(Continued on next page)

NO-TURN shuttle haul



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On every haul cycle, Koehring fast-shuttling Dumptors eliminate slow turns — at the loading unit, at the dumping point, on sharp, "zig-zag" grades. They gain more productive haul time, because Koehring constant-mesh transmission gives the same 3 fast speeds forward and reverse. Here's how much no-turn shuttle operation can increase your production:

SAVE TURN TIME GAIN HAUL TIME

By eliminating only 2 turns on a 1,000' haul, time studies prove that Dumptors can save 30 seconds every round trip, and increase hourly yardage output over 10% per unit. What's more — fast, easy spotting and 1-second gravity dump keep production high.

Remember, too — top hauling efficiency also means increased shovel output. For double profit protection, team fast-shuttling Dumptors with Koehring heavy-duty excavators. Four sizes: 1/2-yd., 3/4-yd., 1 1/2-yd., and 2 1/2-yd.

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C. & E. M. Photo

Looking west along the axis of Big Creek Dam we see random fill being placed and compacted in the foreground.

with a base width of 12 to 28 inches, and a top width of 8 inches. Pouring of the walls started early in May, with the concrete plant in the same setup as was used in the spillway construction. The plant had a capacity of 500 yards for a 12-hour shift.

Building the Dam

While Ewin Engineering Corp. was

active on its phases of the project, L. L. Jarrell, the general contractor, was going ahead with the dam itself, involving the placing of over 1,000,000 yards of fill. Along the axis of the embankment a core trench was dug to a depth of 10 to 12 feet with a bottom width of 20 feet; sideslopes were $\frac{1}{2}$ to 1. This trench was backfilled with impervious material that was continued

on up through the dam forming a clay core 15 feet wide at top elevation 120.0, and with $\frac{3}{4}$ to 1 sideslopes.

On either side of the impervious core is a random-fill section with 2 to 1 slopes from the top of core to the base of dam. A pervious mat constitutes the outside portions of the dam. The crown at elevation 122.0 is 30 feet wide. On the upstream side of the embankment

the slope is 3 to 1, while on the downstream side the slope is $2\frac{1}{2}$ to 1, with a 10-foot wide berm at elevation 105. Under the upstream half of the dam is a 5-foot blanket of impervious material from the slope line to the core.

The upstream face of the dam is provided with a paved surface to protect it against wave action. Gravel drains under the paving release entrapped water pressure. Paving starts at a point 21 feet below the crown of the road, and consists of a 30-foot belt of concrete 6 inches thick, and below that a 15-foot strip of gunned concrete 2 inches thick. The total lack of available riprap in this section of the country made the paving necessary. The downstream slope will be grassed.

Rolled Embankment

For the impervious core, a red sand-clay material was obtained from the spillway excavation and from borrow pits at the west end of the dam. Random fill was also obtained from the spillway hole, as was part of the pervious material, with the remainder of the pervious and random coming from borrow pits on either side of the creek, both up and down stream. A compaction of 95 per cent Proctor density was required in the impervious core, and 90 per cent for the rest of the fill.

The core trench was dug by dragline after the cutoff wall was driven. A Lorain $1\frac{1}{2}$ -yard and a Northwest $\frac{3}{4}$ -yard rig handled the excavation, including the removal of muck which in the central part of the dam was 4 to 10 feet deep. The muck was taken out down to a sand base, loaded to scrapers, and wasted—the only excavated material not used in the rolled fill.

According to the specifications, the contractor was required to place all core-trench backfill in the dry. With the water table only about 6 feet below ground level, a serious water problem arose. Along the higher ground at the ends of the dam, dozers opened up the trench and pushed the wet material downhill toward the creek, leaving a dry hole to be backfilled. When the terrain leveled off across the central portion of the dam, the use of wellpoints was imperative to get rid of the water.

Wellpoint System

Griffin wellpoint equipment was rented, including five 8-inch suction pumps, a jet pump for installing the points, 1,200 feet of 8-inch header, 400 feet of 6-inch header, 1,600 feet of 8-inch discharge line, and enough $1\frac{1}{2}$ -inch wellpoint risers to space on 4-foot centers along the headers. Riser length varied from 8 to 18 feet.

Where water problems arose, portions of the core trench along the cutoff wall were dewatered and excavated. Wellpoints were used in the spillway discharge area to remove the ground water so that concrete for the slabs and walls might be poured in the dry. A multi-stage wellpoint layout was installed with a header line along both sides of the spillway. For the first stage the header was at ground level, and for the remaining stages the pipe was placed 10 to 12 feet deeper.

Dirt-moving progress picked up once
(Concluded on next page)

IN OPEN PITS OR UNDERGROUND



In confined underground operation, Dumphor spots fast, close to shovel . . . no need to turn. Shovel operator has short swing cycle, a big, easy-to-hit 8' x 8' target, for loading Dumphor over either end or sides.



At dump there's no slow jockeying around. Dumphor drives up, body forward; operator hits body release lever; gravity instantly dumps the 6-yd. payload in 1 second . . . Dumphor heads back without turning.



On no-turn shuttle haul, from underground to surface, loaded Dumphor leaves narrow tunnel in same position as it entered . . . travels same speeds forward and reverse easily climbs 24% grades fully loaded.

93/4-ft.-per-min. Parsons 250 Trenchliner®

With 30 digging feeds, Parsons 250 Trenchliner produces up to 93/4 feet of clean-cut trench per min. . . . digs 16" to 42" wide, up to 12 1/2 feet deep . . . cuts within 11" of either side. Reversible spoil conveyor shifts through machine by power in less than 1 min. to dump right or left. Constant discharge height speeds loading into trucks. Larger and smaller models are also available . . . contact your Parsons distributor now.

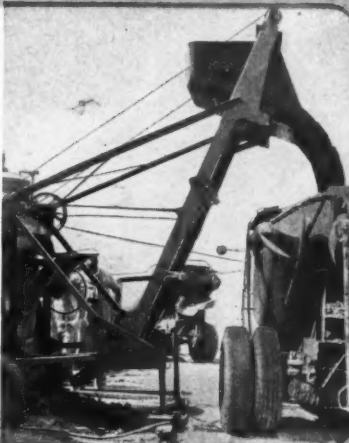
PARSONS (Kochring Subsidiary)
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9'-1" discharge with Kwik-Mix Tower Loader

This Kwik-Mix Tower Loader fits 11-S and 16-S Dandie® concrete mixers, discharges at 9'-1" into trucks, overhead hoppers, or stockpiles. Bucket holds full batch, is powered by mixer engine and dumps automatically at top of tower. Also available for Kwik-Mix No. 10 and 14 bituminous mixers. Get complete information from your Kwik-Mix distributor, or send for literature on low-cost, time-saving Tower Loader today.

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In various sizes of 11' and 12' diameters, provide 254, 373, 492, 611-bbl. and larger cement storage. Gasoline or electric-driven screw conveyor and bucket elevator, box-car, truck receiving hoppers or undertrack unloading arrangement, electric bin signals, aeration diffusers, one or two 1000-lb. batchers. Larger batcher, added leg and elevator height available for mix truck charging. Silos are 1-piece, all-welded.

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Earth Dam in Alabama Has Pile Cutoff Wall

(Continued from preceding page)

the core trench was backfilled. Jarrell hauled material with a fleet of equipment that included an 18-yard La-Plant-Choate motor scraper, three 14-yard Tournapulls, thirteen Caterpillar DW10's with 8 to 11-yard scrapers, and an Adams 6-yard scraper pulled by an International TD-14 tractor. Fills were placed in 6 to 8-inch lifts, leveled off by dozers, compacted by tamping rollers, and shaped by motor graders. Dozer equipment included a Tournadozer, 2 D8's, 1 D7, 2 D6's, 2 TD-24's, 1 TD-18. The motor graders were a pair of Caterpillar No. 12's. Average haul with material was 3,000 feet, with the maximum being 6,000 feet covering some of the spillway excavation that was placed in the dam. The embankment is made up for the most part of sand, clay, or a sand-clay combination.

Supply Reservoir

The heavier 6-inch concrete paving for the upstream slope is designed to protect the face of the dam from wave wash. The lighter 2-inch belt lower down will be under water normally, and thus not subject to erosion. Ewin will pave the 35-foot section in alternate 6-foot blocks, with the 27-E paver working from the crown of the dam. Forms will be built with 1 x 6's.

The Gunite Concrete & Construction Co. of Kansas City, Mo., will handle the lower 15-foot portion of slope protection, building up the 2-inch thickness of Gunite over wire mesh laid directly on the dirt fill.

The 6,600-foot dam is not straight for



C. & F. M. Photo

From left to right, President T. A. Smith and Superintendent J. F. Carver of Ewin Engineering Corp., and Resident Engineer Gus Flach of J. B. Converse & Co., Inc.

its full length, but contains two slight one-degree curves by which advantage is taken of high ground. The spillway structure is about 200 feet north of the major portion of the dam axis. The dam will form a reservoir over 8 miles long with a surface area of approximately 3,600 acres, and a storage capacity of 14,774,000,000 gallons. Because of the new reservoir a power line will be relocated, also a road. The old road, north of the dam, will be abandoned and replaced with a new one 4 miles long across the top of the dam.

Quantities and Personnel

The major items in the dam contract for the Big Creek Water Supply Project

include the following:

Steel sheet piling	140,000 sq. ft.
Clearing	130 acres
Excavation	1,371,000 cu. yds.
Impervious fill	423,000 cu. yds.
Random fill	282,000 cu. yds.
Pervious fill	346,000 cu. yds.
Topsoil	22,000 cu. yds.
Concrete slope paving	13,000 sq. yds.
Gunned concrete	5,200 sq. yds.
Concrete, structures	14,000 cu. yds.
Reinforcing steel	1,200,000 lbs.

L. L. Jarrell employed an average force of 40 men on the earthwork operations under the direction of Bill Boulter, Superintendent. The prime contractor worked a single 10-hour shift.

Ewin Engineering Corp., with J. Floyd Carver as Superintendent, employed 50 men working two 8-hour shifts. Light for night work was furnished by a Master 6.3-kva electric plant furnishing current for 600 bulbs of 100-watt size.

J. B. Converse & Co., Inc., the consulting engineer, was represented on the dam contract by Gus Flach, Resident Engineer. H. E. Myers is Executive Vice President.

... you should hear what the
home-town folks say about 'em



Payloader in use by City of Waukesha is powered by a Model DLCA Waukesha Diesel Engine. (The truck has a Waukesha Engine, too.)

● The home-town folks are not easily impressed. They know you and your product, too. Save your sales talk—they pay off on performance.

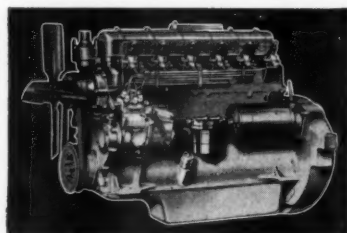
This comes to you direct—from the home of Waukesha Engines. And it's Mr. W. E. Dick, City Engineer, talking—"The City of Waukesha, Department of Public Works, now has twelve pieces of engine-driven machinery... powered with your engines. Among the most satisfactory units we own is the Hough Payloader which we have had in constant use... the lively acceleration and

quick pick-up of your power plant in this machine, and the speed and flexibility of itself in maneuver, is beyond description... (it) handled so quickly, and with so little interruption to traffic, the heavy snows, sleet and ice that clogged gutters and crossings. Any bulk material loading job is easily and quickly handled by this versatile rig... also very useful in grading. This Hough Payloader with Waukesha power can't be beat."

Payloaders—tractor-shovels that dig, load and carry all types of material—are made by The Frank G. Hough Co., Libertyville, Ill., who power them with Waukesha Engines. Mr. Dick can tell you why. He has "been using your (Waukesha) power plants for years with complete satisfaction. The durability built in, leaves nothing to be desired." Get Bulletin 1411.

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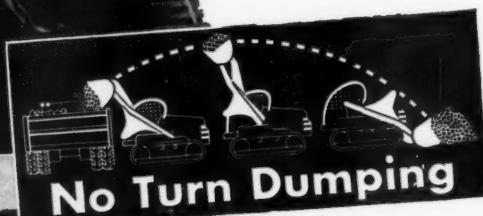
Model DLCA Waukesha Diesel Engine—six cylinders, 3½-in. bore x 4-in. stroke, 265 cu. in. displacement, 8" maximum hp at 2600 rpm.



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50% more yardage with LODOVER



No Turn Dumping

LODOVER crowds into and loads material—Backs straight out—bucket moves overhead at controlled speed—Stays level—in back position bucket turns over completely as operator dumps load—Bucket returns to digging position as LODOVER moves forward... Complete overhead cycle takes only 20 seconds.

... LODOVER overhead loading eliminates 2 full turns—saves 15 seconds in every cycle! Seconds saved add up to extra yardage—60% if distance from cut to truck is 30 ft.—43% if distance is 40 ft. ... Add big extra yardage to reduced tractor maintenance costs—both due to "no-turn" overhead operation—and you have the reason why LODOVER makes extra money for you on any job!

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This power hacksaw, the Super-Saw, is a new and improved model. Among its features is a one-piece heat-treated alloy-steel piston with a separate clamping jaw.

New Power Hack Saw

A new and improved model of the Super-Saw, a power-operated hacksaw, has been announced by R. C. S. Tool Sales Corp., Joliet, Ill. Power for the Model T may be provided by any heavy-duty $\frac{1}{4}$ or $\frac{5}{16}$ -inch electric drill, air drill, or flexible-shaft tool.

The saw features a one-piece heat-treated alloy-steel piston with separate clamping jaw. The entire unit is sealed against grease leakage. Like other Super-Saws, this one needs no starting hole. Held tightly against the material to be cut, with the guide used as a fulcrum, the tool is simply "rocked" into an upright position and then guided along the cutting line. The blower which keeps the machine cool also blows chips or sawdust away from the cutting line. A new grip and redesigned shank for the Vise-Loc saw blades are further improvements.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 643.

Vertical Sump Pumps

A new line of vertical sump pumps has been announced by The Deming Co., Salem, Ohio. The four basic units are made in a range of sizes from 1 to 10-inch discharge, with capacities from 10 to 3,000 gpm and heads up to 140 feet. In the 2, 3, and 4-inch discharge sizes, they can be equipped with standard or special fluid ends for handling sewage. The pumps are furnished with electric motors from $\frac{1}{2}$ to 75 hp, or for steam-turbine drive. Motor mounting is regularly designed for a standard NEMA Type C flange but the pumps can be furnished with an adapter flange for other types of motor-mounting brackets.

Features are said to include heavy-duty construction, dowel-ring fit from motor to impeller, and alignment of all rotating and guide bearing parts. Column pipe connections are flanged and bolted for easy maintenance, the company says. Guide bearing assemblies are interchangeable as intermediate or bottom bearings in the pump assembly. In the thrust bearing assembly, the lower half coupling fits into the bore of a large-capacity angular contact radial and thrust ball bearing. The shaft is of SAE 1040 steel with a hard stainless sleeve through the bottom guide bearing and motor support shaft seal assembly. Semi-open-type impeller is adjustable vertically with the shaft, and is mounted on it with locking taper, woodruff key, and safety-lock nut. Duplex units can be furnished and equipped with alternator float switch for automatic operation of each pump in sequence or both pumps simultaneously, as required.

Further information may be secured from the company by requesting Bulletin No. 4600 A. Or use the Request Card at page 16. Circle No. 691.

Mower Maker Buys New Plant And Names New Sales Mgr.

Toro Mfg. Co., Minneapolis manufacturer of power mowers, has bought a new plant at Windom, Minn. Beginning this fall, it will assemble its reel-type mowers there instead of in the home plant. This is the third step in Toro's expansion; in December, 1948, the company purchased the Whirlwind

plant in Milwaukee for the manufacture and assembly of its rotary-type power mowers, and later acquired Coldwell-Philadelphia as a subsidiary.

The company also announces that it has appointed a new sales manager for Coldwell-Philadelphia. He is Ben Reemelin, who used to have charge of dealer sales for Toro.

Trailer-Type Digging Unit

A 4-page bulletin outlining the construction and operating features of the Hopto, a hydraulically operated power-takeoff excavator, is available from Badger Machine Co., 1122 W. 5th St., Winona, Minn. The trailer-type unit may be operated from the power take-off of any tractor, Jeep, or truck. Fitted with various end attachments, it may be used as a trench digger, loading shovel, or crane; conversion is easy, according to the literature.

The bulletin illustrates the unit in use and presents general specifications, details of all features, and diagrams showing operating dimensions. It points

out that the Hopto is completely hydraulically operated from the power takeoff of the driving unit. No additional equipment or attachments are required. The boom has full 180-degree swing. Backhoe buckets are available in widths from 8 to 24 inches.

This literature may be obtained from the company, or by using the Request Card bound in at page 16. Circle No. 562.

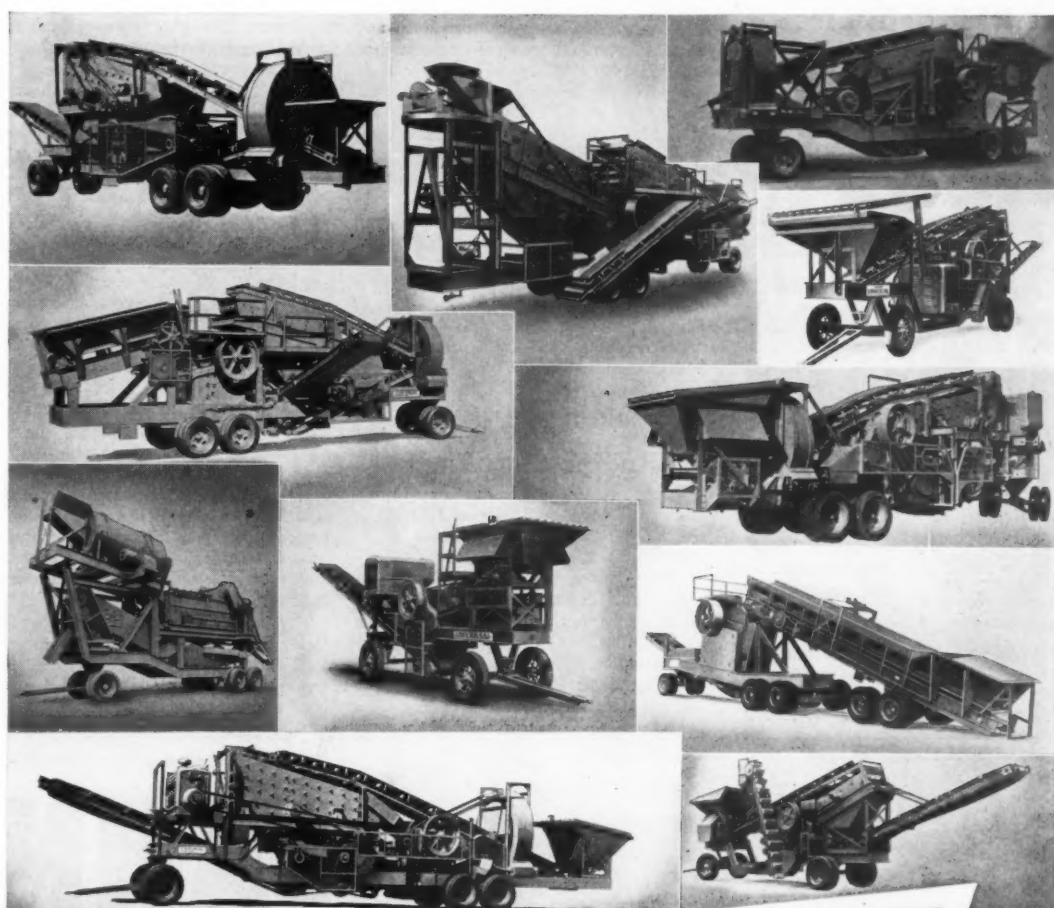
Roebbling Ups Kadlic

John P. Kadlic has been appointed Philadelphia district sales manager for the wire-rope division of John A. Roebbling's Sons Co., Trenton, N. J. He replaces Vincent L. Daulton, who lost his life in a recent train wreck. Prior to this appointment, Mr. Kadlic was the company's sales representative in the St. Louis area.

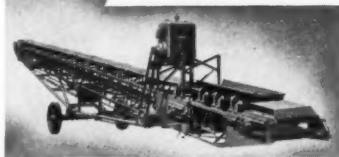
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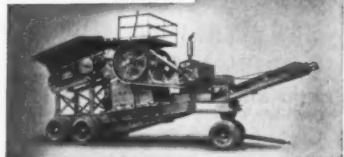
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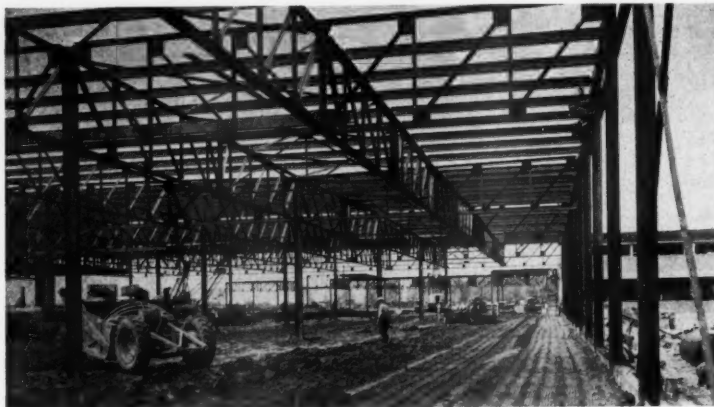
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New Chrysler Plant Nearing Completion

Construction of Chrysler Corp.'s new Indianapolis parts manufacturing plant is running on schedule, despite the severe winter weather which followed groundbreaking at the site last October. More than half of its structural steel is already erected. At the present rate, construction is expected to be finished by late summer. When completed, the main building will have a manufacturing area of 650,000 square feet and a total floor area of 718,000 square feet.

An unusual feature of the building will be the use of Cycleweld panel siding for the upper part of the structure, above the windows. The panels are made by bonding sheets of aluminum to honeycombed kraft paper by a special process developed by Chrysler's Cycleweld Division. Use of the panels will speed construction because they can be bolted quickly into place. In addition, the panels will provide superior insula-



Steel rapidly takes shape for the main manufacturing building of the auto parts plant now being built by Chrysler Corp. at Indianapolis.

tion, reduce maintenance costs, and give the plant a distinctively modern look.

The administration building in front of the main manufacturing building will be a 2-story reinforced-concrete structure, with one-story north and south wings to house the cafeteria and employment and medical departments.

The office building will have a floor area of 47,000 square feet, and the total floor area of all buildings in the installation will be 782,000 square feet. The plant is located on a 114-acre tract on the northeast outskirts of Indianapolis.

A 5½-foot storm sewer, emptying into Pleasant Run Creek ½ mile east of the plant, is also under construction. To prevent rapid rise of the creek in the event of prolonged heavy rainfall, Chrysler has acquired a 17-acre tract on the creek and is constructing a 4-acre holding basin so that storm drainage can be fed into the creek gradually.

Engineering Texts

Four new engineering texts have been published by McGraw-Hill Book Co., 327 W. 41st St., New York 18, N. Y.

The first is a third edition of "Corrosion—Causes and Prevention" by Dr. Frank Newman Speller. Written with particular reference to ferrous metals, this book discusses the theory of corrosion and describes methods of preventing it. Highlights of the new edition are its coverage of cathodic protection and information on biolog-

ical influences and newly developed corrosion preventives. Price \$10.

The second book, "Nomographic Charts", prepared by C. A. Kulmann, a consulting engineer, contains 92 charts designed to help solve computation problems encountered daily by engineers. The charts enable the user to arrive at preliminary solutions to problems without looking up the values of various items in tables. According to the author, these charts eliminate a large percentage of routine work and sometimes provide a greater accuracy than can be achieved by slide-rule calculations. The nomographic charts include five categories of frequently used engineering computations: function scales, hydraulics and hydraulic equipment, mechanics, thermodynamics, and electrical. There is also a group of general-usage charts covering reciprocals of reciprocal sums, sinking-fund deposits, properties of rectangles, etc. Price \$6.50.

The third edition of Dull & Dull's "Mathematics for Engineers" is designed to serve as a one-volume reference library on a wide range of mathematical subjects. It provides graphical solutions to parallel analytical solutions and gives illustrative problems for all important cases. Advanced mathematical theories are all discussed in practical terms. Price \$7.50.

The fourth book published by McGraw-Hill is "Hydraulic Transients" by George R. Rich. This practical book shows how arithmetic integration and trial-and-error arithmetic are applied to the solution of many problems in

hydraulic transients. For the designing engineer and those in the hydraulic and hydroelectric fields, it furnishes not only adequate background for calculating particular problems by arithmetic, but also the essential mathematical foundation for the supporting theory. Price of this book is \$7.00.

These books may be obtained from the publisher.

Materials-Handling Truck

A 4-page bulletin on a heavy-duty materials-handling buggy is offered by Kalamazoo Mfg. Co., Kalamazoo, Mich. It includes specifications, dimensioned diagrams, and on-the-job illustrations.

The Kal-Truk is available with a standard ¾-yard-capacity dump body or a 3,000-pound platform body. Powered by a 13-hp 2-cylinder Wisconsin air-cooled engine, it has 3 speeds forward and reverse.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 571.

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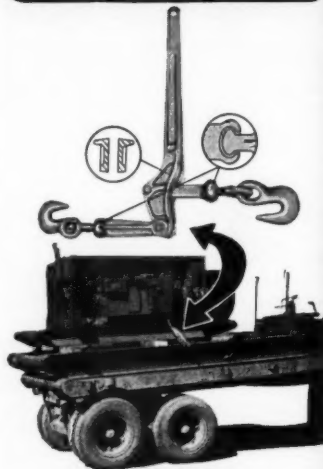
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Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief extracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Job Volume Was Decreased; Contractor's Rights Defined

THE PROBLEMS: A contract to repair an outfall sewer consisting of concentric rings of brick fixed the total volume of work at 22,849 square feet. It provided that the work would not be increased or decreased more than 25 per cent. But the city decreased the footage to 10,685 square feet. As to the inner ring, the contractor's bid was based on inner-surface measurements. (1) Was the city liable for the contractor's loss of profits resulting from reduction of the footage? (2) In computing the contractor's damages, should the inner-surface measurements be binding?

THE ANSWERS: Yes. (Hoagland v. City of Los Angeles, 229 Pac. 2d 823, decided by the California District Court of Appeal, Second District.)

1. Instructions to bidders stated that quantities estimated were approximate only and were not guaranteed to be correct. The court said that this fact did not empower the city to change the quantities at will without compensating the contractors for resulting loss of profits. The specification of quantities in the contract was controlling; the permission to vary the work volume not more than 25 per cent was controlling.

2. As to measurement of the work on the inner ring—the court found from the evidence that the contractor had figured the material needed by the fact that the bricks were to be laid on a curve and that his bid was accordingly submitted. Two of the three justices of the court ruled that to allow pay on any other basis would give the contractor more than he was entitled to.

Justice Wilson, dissenting, was of the opinion that to measure the work on the perimeter of the top of the arch would give the contractor too much, and that to measure it on the inner surface would give him too little. Therefore, he thought, on the strength of expert testimony that had been offered at the trial "the only method of ascertaining the true number of square feet of work performed in removing and replacing brick on an arch is to use the center or mean line of the thickness of the arch, thus basing the computation on the average of the two areas, the upper and lower perimeters; thereby the result would be the same and the area of the surface would be the same as if the arch had been flattened out."

But, as above noted, the majority thought that such measurement was precluded in this case by the method of measurement adopted by the contractor in his bidding. The difference involved about \$14,000.

Actions Louder Than Words

THE PROBLEM: When, during litigation over a contract, a court is in doubt as to the meaning of the agreement, it will usually give effect to the acts or omissions of the parties in the course of performance, which indicate mutual understanding. In short, the parties' "actions may speak louder than words".

Change orders in a contract called for special gutter excavation. Peculiarities of terrain necessitated more hand labor on this excavation than was involved in common and ditch excavation called for by the prime contract and to be paid on a measurement basis. The parties, it was shown, did not behave as if that contract covered the special gutter excavation. Was the subcontractor entitled, therefore, to special pay for the special gutter excavation?

THE ANSWER: Yes. (Nassif v. United

States, 187 Fed. 2d 794, decided by the United States Court of Appeals, First Circuit.)

The Court of Appeals approved the trial judge's adoption of "the practical interpretation put upon the contract by the parties to it instead of a strictly literal interpretation of its terms at variance with its practical application by those who had entered into it."

Blasting-Cap Dealer Liable When Contractor's Man Hurt

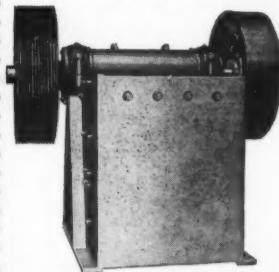
THE PROBLEM: An employee of a contractor, engaged in blasting holes for power-line posts, was injured through

(Continued on next page)

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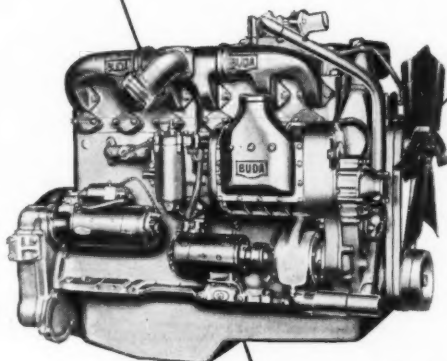
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Avoid Legal Pitfalls

(Continued from preceding page)

delayed action of dynamite caps detonated by electricity. Could he hold liable the dealer—not manufacturer—who furnished the caps to the contractor, (1) on a theory that the dealer had warranted to the contractor that the caps would explode the dynamite instantly, or (2) on a theory that the dealer knew the use to which the caps were to be put and negligently furnished delayed-action caps knowing that they would be used as if of instantaneous type?

THE ANSWERS: (1) No. (2) Yes. (Green v. Equitable Powder Co., 94 Fed. Supp. 126, decided by the United States District Court, Western District of Arkansas, Fort Smith Division.)

1. The court recognized that in Arkansas, as in many other states, the courts have adopted the legal view that since a warranty is contractual in nature, one who does not bear a contractual relationship to the warrantor cannot enforce it.

2. But, still following what it regarded as the majority judicial view, the court decided that, because contractual relationship is not essential to liability for negligently causing injury to another, the dealer would be liable to its customer's employee if it knew or ought to have known that it was furnishing caps that would be mistaken for the instantaneous kind and thereby result in injury.

Authority, Not Contractor, Liable to Property Owners

THE PROBLEM: A street contractor encroached on abutting land to the extent of sloping it and removing trees, instead of building a retaining wall. The contractor followed the state engineer's directions and the city had agreed with the state to secure necessary right-of-ways. Was the contractor liable to the owner of the abutting land?

THE ANSWER: No. (Wood v. Foster & Creighton Co., 235 S. W. 2d 1, decided by the Tennessee Supreme Court.)

The court said that it was well settled law in Tennessee "that a contractor constructing a public improvement for a public authority is not liable to a private property owner for the resulting damage where the contractor acts" according to the public authority's orders and is not itself negligent in doing the work. The court cited its pre-

vious decision that a county road contractor was not liable for damage necessarily done in blasting. In short, the complaining abutter must look to the contracting authority for damages, not to the contractor. (9 S. W. 2d 700.)

In the Wood case, the court said that because the city had not specified that there should be a retaining wall along the side of the street, the state engineering department had a right to choose use of a sloping bank as being more economical; leaving it to the city to bear the expense of paying the abutters for their resulting damages, if any.

County Leases Road Grader; Liable When It Is Destroyed

THE PROBLEM: An Ohio county leased a road grader, agreeing to return it in good condition. Through negligence of the operator, who was furnished by the lessor but who was under the control and direction of the county, the grader was demolished in a railroad grade-

(Concluded on next page)

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Avoid Legal Pitfalls

(Continued from preceding page)

crossing accident. The insurance company, having paid the amount of the loss to the owner of the grader, sued the county for reimbursement. Was the county liable to the lessor for the reasonable value of the grader in the condition in which it should have been returned?

THE ANSWER: Yes. (Home Insurance Co. v. Board of County Commissioners, 97 N. E. 2d 231, decided by the Ohio Court of Appeals, Lorain County.)

The County argued it was not liable (1) because the lessor furnished the negligent operator, and (2) because a county, being a governmental agency, is not under the same liability for failing to return leased equipment in proper condition as is a private lessee. The court rejected this argument.

The court said the operator could not be regarded as having been the agent of the lessor at the time of the accident, because he was under control of the County as to where and how he should do his work.

As to governmental immunity, the court said that the statutory power of the County to lease the grader impliedly carried with it the power to make a binding contract to return it unharmed at the expiration of the lease.

Residents Could Not Enjoin Operation of Asphalt Plant

THE PROBLEM: Homes were located 700 feet or more from a portable asphalt plant set up on a railway right-of-way and only occasionally operated. The home owners enjoined its operation on the ground that dust, produced in careful operation of the plant, blew their way and inconvenienced them. Were they entitled to enjoin its operation?

THE ANSWER: No. (Hofstetter v. George M. Myers, Inc., 228 Pac. 2d 522, decided by the Kansas Supreme Court.)

The court's decision was based upon the facts that the plant emitted no noxious odors or fumes, soot or smoke—only dust no more objectionable than dust blowing from a highway—and that the plant was not negligently operated. The court also stressed the point that there was no showing that any "actual injury or damage" to person or property resulted. It was not enough that the plaintiffs might be "inconvenienced".

Damaging Refusal to Certify: Sub's Right to Sue Engineers

THE PROBLEM: If, intending to injure a subcontractor, an owner's engineers willfully and inexcusably refuse to certify to the owner that the general contractor is entitled to pay for work done by the subcontractor, can the latter maintain suit against the engineers for damages?

THE ANSWER: Yes. (Unity Sheet Metal Works v. Farrell Lines, 101 N. Y. Supp. 2d 1000, decided by the New York Supreme Court, Special Term, New York County, Part III.)

The court said that the mere refusal by an architect to issue a certificate of performance does not make him liable in damages to an injured party. But a deliberately wrongful refusal cannot be excused on the ground that engineers and architects will be imperiled if made legally liable for refusal to issue certificates.

If a subcontractor can sue in such cases, it would seem to follow that a prime contractor could sue an engineer or architect for damages resulting to him from wrongful refusal to issue a certificate.

No U. S. Transportation Tax For Dirt-Moving, Court Says

THE PROBLEM: A grading contractor sublet to a haulage contractor the work of moving, with his own trucks and men, materials from one point to another within the tract being graded. Was the compensation paid the subcontractor subject to Federal transportation tax?

THE ANSWER: No. (Edward H. Ellis & Sons v. United States, 187 Fed. 2d 698, decided by the United States Court of Appeals, Third Circuit.)

The court noted that there is no tax assessable for the mere rental of trucks to be used by a contractor. It decided that earth moved in a grading or excavating process is "property", but not property moved from one point to another within the United States where it is moved within the area of a construction site. Several other court decisions were cited by the Court of Appeals in support of the conclusions reached in this case.

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Is Polaris on Your Parties?

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"A few years ago, we were hounded by taxpayers, trying to find their property's relation to the city boundary. The line was last run in 1888, and large areas had been annexed to York since that time. Confusion was mounting, so a precise survey seemed the only answer."

"We found only four stones surviving from the old survey, and had to start practically from scratch. The line proved to be 11.4 miles long with 77 changes of direction. Obstacles—natural and man-made—faced us all along the way, so we feared that error might be creeping into the work. But, by taking observations on Polaris, we saved ourselves considerable grief."

"Wanting to use the star at elongation—to take advantage of the 20 minutes when total changes in azimuth is only six seconds—we checked our Gurley Ephemeris; and made the



first observation after midnight, in below-freezing weather. This result was carried to another point about two and one-half miles distant in longitude, where a second observation was made. Allowing for convergence of meridians, we found the bearings did not agree. Checking computations pinned down the error...saved carrying it around the city."

"In all, we made five observations—the last, fortunately, on a much warmer evening in spring. Through these observations—and good instrument work—the survey was closed without any angular error."

Two Jobs—A Gurley on Each

Bill Weigle works five and a half days a week at his job in York City Hall. In spare time, he continues a private civil engineering practice in which two sons, Robert and Donald, will join him after graduation from the Rensselaer Polytechnic Institute.

On both the city job and in private work, Weigle uses Model 132-R Gurley Transits—one, a "minute gun"; the other, "20 seconds." Weigle says, "The two dependables—the north star and a Gurley Transit—make a team any engineer can count on for his most accurate work."

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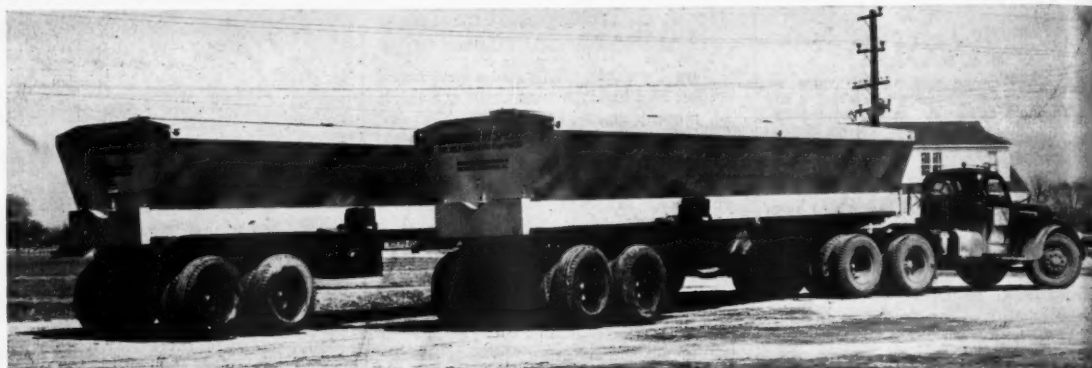
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Prefabricated Units Lead In European Home Building

Six leaders in the construction industries of Sweden, Denmark, and Austria were ECA guests in the United States this summer. They began a 5-week tour of some major home-building centers by inspecting the \$9,000,000 Saddle Rock Homes development under construction by Sam Berger, builder, Great Neck, N. Y. The visitors agreed that the greatest single difference between home building techniques here and abroad is that prefabricated units dominate European home construction.

Fritz Ivar Malmstrom, Manager of the Skinnskatteberg plant of the State Forest Industries, Ltd., in Sweden, explained that a typical prefabricated dwelling with four rooms and a kitchen is sold at a base price equivalent to \$4,000. This price does not include the lot, basement, plumbing, or utilities. The Government of Sweden plays much the same role as the FHA and VA in



Baughman Mfg. Co. thinks these 35-foot screw-type bulk-cement bodies it built may be the longest of their type ever constructed. Arnold Machinery Co. of Salt Lake City sold them to Pack Truck Line of Idaho Falls, which will haul for Arrington Construction Co. and Ready-to-Pour Concrete Co. of Idaho Falls—also for AEC's Arco Proving Grounds under way nearby.

this country in guaranteeing bank loans to purchasers.

Kai Flor Egund, a director of the Research Committee of the Danish Wood Working Industry, said that lumber costs in Denmark have risen and new homes are using more brick and concrete construction.

Private building in Austria is almost at a standstill and the Government is the most important producer of low-rent apartments. Ernest Armbruster, Chief Constructor of the Timber Construction Factory of Vienna, pointed out that with the wage-earning capacity of the Austrian worker averaging only \$12 a week, apartment rentals of \$3 a month are not unusual. Egon Samek, Manager of the Export Department of the International Export Sales Organizations of the Kornerwerke, Styria, in Vienna, said that his firm is exporting prefabricated housing to Turkey, Israel, and Ethiopia to be sold at \$4,000 a unit because the company cannot find a market in Austria even at the price of \$2,000 a dwelling unit.

Rubber Rejuvenator

A surface plasticizer for natural rubber has been developed by Schwartz Chemical Co., Inc., 326 W. 70th St., New York 23, N. Y. When applied properly to hardened and slipping rubber parts such as feed rolls, suction grips, and friction wheels, Rub-R-Vive restores the original feel, resilience, and grip of new rubber, the company says.

Rub-R-Vive is best applied by a cloth. The first few strokes should be

vigorous in order to remove caked-on foreign matter or dirt. A thin film of liquid is then allowed to sink into the rubber. Badly hardened and aged rubber parts may require more than

one treatment. Standard packaging is in pint, quart, and gallon cans.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 556.

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Carry it with one hand. One-ton model, with coil chain for standard lift of 8 ft., weighs only 38 lb.

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Trust it to protect men and equipment. Tested at 100 percent overload. All load-holding parts are special alloy steel. This hoist actually has a five-to-one safety factor.

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The Whitestown trencher is equipped with a 1/2-yard standard bucket. Special buckets, made to individual specifications, may be obtained. It will dig to a depth of 8 feet and dump at a height of 12 feet. This trencher has been in constant use for four years, and has proved to be rugged and satisfactory in every way.

• Immediate delivery can be made.

• Please specify make of tractor.

WHITESTOWN TRENCHER CO., INC.

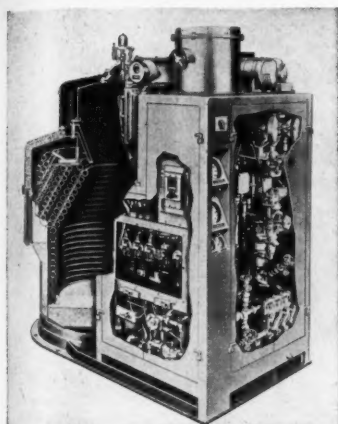
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Phone: Utica 6-1117



The Whitestown Trencher is now available for use on the following hydraulic controlled tractors:

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International TD-6 & TD-9 equipped with new Bucyrus-Erie dozer-shovel
International TD-6, TD-9 & TD-14-A with Hough Bulldozer-shovel
Hough Model HM-Payloader
Oliver with 4-A Lull Loader



The Vapor-Clarkson Model 4740 steam generator develops 200 pounds of steam pressure in two minutes from 50-degree cold water.

Steam Generator

A new generator to provide steam for pile drivers, hoists, asphalt plants, and similar construction-job service has been announced by Vapor Heating Corp., 4501 W. 16th St., Chicago, Ill. Model 4740 develops 200 pounds of steam pressure in two minutes from 50-degree cold water, and produces 4,800 pounds of 99 per cent dry steam (82 per cent efficient) per hour, the manufacturer reports. It is 52 inches wide, 76 inches long, and 78 inches high.

The unit uses No. 2 fuel oil. Hot gases wipe over the 702 feet of steel coil, turning water pumped through the coil into steam. An electric motor, or a gasoline engine on the portable models, drives the water pump, fuel pump, blower, and magneto. It is started by turning one switch; then automatic controls take over. They turn the machine on or off and produce steam only when it is needed. Steam pressure may be changed from 75 up to 600 psi by turning one control.

Among its features are a number of safety controls—steam temperature-limit control, stack temperature cut-out, safety valves, electric flame control, time delay relays, and others. The manufacturer points out that the machine is constructed in accordance with ASME and Hartford specifications.

Further information may be secured direct from the company. Or use the Request Card at page 16. Circle No. 623.

Adjustable Truck Seat

An Airfoam-cushioned truck seat to reduce driver fatigue has been designed by The Goodyear Tire & Rubber Co., Akron 16, Ohio. It can be adjusted both fore and aft to the proper seat angle, back angle, and height, to meet requirements of all drivers. The tubular framework is complemented by Airfoam cushioning on seat and back to give comfort and healthful support for all body contours.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 596.



For truck-driver comfort—an Airfoam-cushioned seat, completely adjustable.

Cathodic Protection Inhibits Corrosion

Design and installation of cathodic protection devices to increase the working life of underground pipelines, water-storage tanks, lead-sheathed cable, etc. is a new service offered by Harco Corp., 16925 Broadway, Cleveland, Ohio.

Harco-engineered installations utilize direct current radiating from anodes to suppress galvanic cell activity and prevent corrosion. Specially designed oil-immersed selenium rectifiers, ground anodes, and backfill materials are used for installations.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 559.

Asphalt-Paving Plants

The recently developed SM Series asphalt-paving plants are the subject of two 4-page bulletins prepared by Standard Steel Corp., 5001 S. Boyle

Ave., Los Angeles 58, Calif. One bulletin is devoted mainly to operators' experience with the equipment in the field. The second deals with construction details of the plants.

The SM Series plants come in batch capacities from 500 to 6,000 pounds. Their structural improvements include individualized drives, one-man operation, sectionalized mixer linings, and streamlined design. Increased capacity

is claimed for them because of their synchronized operations. Detailed data and illustrations are given for the direct-heat rotary dryer, weighing units, twin-shaft mixer, and cyclone dust collector.

This literature is conveniently bound in a looseleaf file cover and may be obtained from the company, or by using the Request Card at page 16. Circle No. 573.

"BERG" Concrete Surfacers



A light-weight, portable, electric motor-driven Concrete Surfacers consisting of the Model R2 Right Angle Head and Model AS Motor Unit.

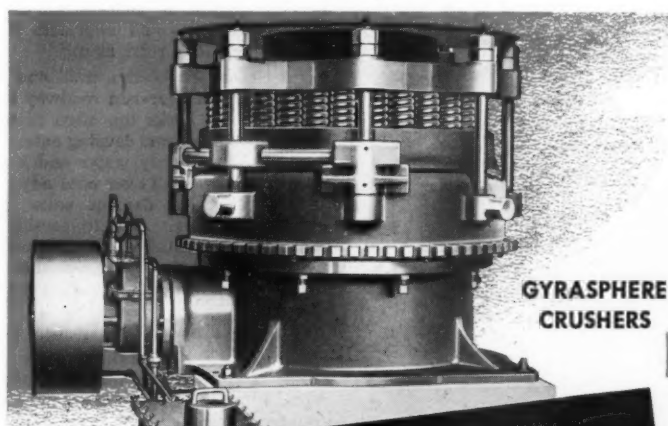
Ideal for surfacing concrete buildings, bridges, dams, walls and many other applications.

Quickly converted into the Model V2-AS Concrete Vibrator for internal vibration by substituting the Model V2 Vibrator Unit for the above Head.

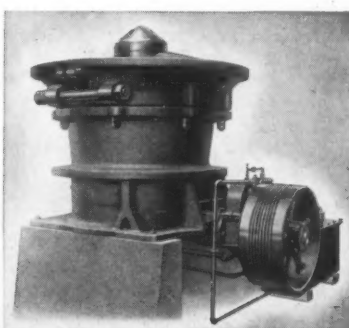
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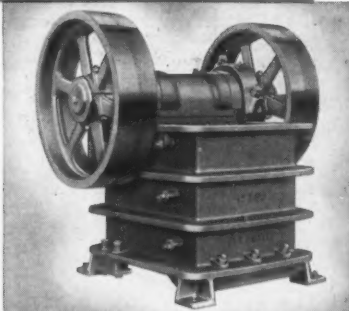
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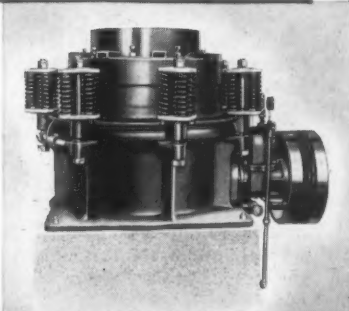
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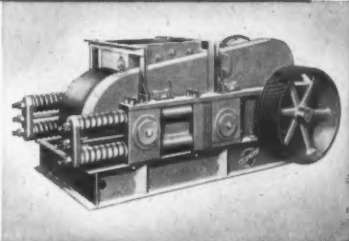
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Erosion Control Pays Big Double Dividend

Almost Three-Fourths of States Are Now Buying In. Survey Shows, With Programs to Combat Roadside Erosion

• STATE highway departments throughout the nation are placing increased emphasis on a relative newcomer to the road engineering field—erosion control.

A nation-wide survey conducted by CONTRACTORS AND ENGINEERS MONTHLY indicates that at least 35 states now have programs, more or less full-fledged, that are designed to combat the costly and unsightly effects of roadside erosion. In most of the remaining states, erosion control is incorporated in new construction. In others, it is considered

impractical at present for various reasons: climatic conditions, insufficient funds, high local costs, and the like.

It wasn't long ago—about 20 years—that many engineers were inclined to scoff at what they termed "roadside beautification". Such nonsense cost good money, they cried, and was best left in the hands of the garden clubs. Today, road engineers generally agree that erosion control pays a healthy double dividend in the form of reduced maintenance costs and more attractive roadsides. The attractive roadside is an



Bureau of Public Roads Photo

On this cut slope in Connecticut, erosion is under complete control. Except for one swath above the ditch line, it has not been mowed for several years. Invasion of native growth helps the original seeding to protect the slope from erosion and adds considerably to its "natural" appearance.

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acknowledged lure to the lucrative tourist trade and a contributor to highway safety, but the cost-cutting factor is what interests and impresses most budget-conscious road men.

Where erosion occurs, mud and silt fill ditches and over-run roadway surfaces. Water backs up, often seeping under pavements and causing extensive damage. Frequently water and accumulated debris spill over onto adjacent property, inviting damage suits from irate landowners. Where erosion is concerned, most states now give definite credence to the old maxim that an ounce of prevention is worth a pound of cure.

Methods and means vary from state to state, the C&E Monthly survey disclosed, and there are but few definite regional patterns. No section of the country stands out as the leader; in every section a majority of the states are actively engaged in erosion-control work.

In many states, programs have undergone rapid expansion in the past year or two. In Iowa, for example, last year's seeding and sodding program was more than 50 per cent greater than the annual average for the three preceding years. Last year in Iowa, 3,700 acres were seeded, 53,000 square yards sodded. During the previous three years, an average of 2,173 acres were

seeded, 26,798 square yards sodded.

On the other hand, one state was unable to cite any figures at all because its erosion-control program has "just

(Continued on next page)

THE "Quinn Standard" FOR CONCRETE PIPE



The Quinn Standard is known as the best in the world over, wherever concrete pipe is produced and used. Backed by over 35 years' service in the hands of hundreds of Quinn-educated contractors, municipal departments and pipe manufacturers who know from experience that Quinn pipe forms and Quinn mixing formulas combine to produce the finest concrete pipe at lowest cost.

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For making pipe by hand methods by either the wet or semi-dry processes. Built to give more years of service—sizes for pipe from 18" up to 120" and larger—longer and grooved or bell and pipe at lowest cost.

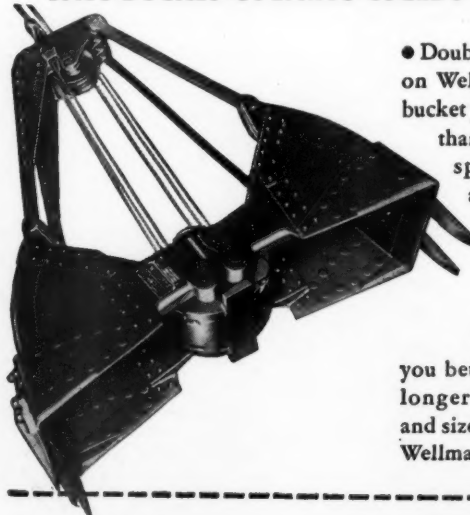
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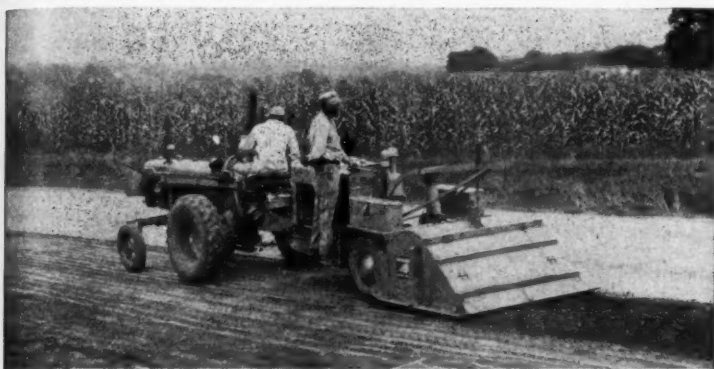
Wellman's welded-design buckets offer you better performance and longer service. In all types and sizes you'll do better with Wellman!

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Kentucky Dept. of Highways Photo

Road equipment has been found adaptable to seeding and mulching operations. In Kentucky—a Seaman Pulvi-Mixer cuts in lime and fertilizer on a shoulder.



California Division of Highways Photo

Agricultural equipment plays its role in roadside erosion control. This farm tractor and harrow are in use in California.

started". Several others found them-selves in virtually the same position.

Types of Seeding Done

The survey asked states to name the months in which they plant their grasses, legumes, and mixtures. Responses indicated that most seeding is done between March and November, with April and September the most popular months. In warm-climate states, seeding is often a year-round operation. Texas uses a rule of thumb with more or less universal application. It seeds "for 90 days after the last killing frost in the spring, and for 60 days preceding the first killing frost in the autumn."

The amount of seeding done varies widely. Each state was asked how much average annual seeding it had done over the last five years. In many instances the figure was not available because seeding programs had started only recently, or because records were kept on different bases. Kentucky, for instance, reported that 60 miles were seeded by contract, but that no records were available to indicate the "many miles" seeded by maintenance forces.

Some states reported seeding only around 10 miles a year. At the other extreme was Michigan, heading the list with an annual average over the past five years of 658 miles, covering 3,880 acres. North Carolina estimated 1,300 miles of shoulder and slope seeding, 200 miles of "complete seeding".

C&E Monthly was also interested in finding out just what areas are seeded. Each of the 35 states plants on slopes. Virtually all of them seed shoulders, and most seed ditches. Two states—Kansas and Iowa — seed the entire right-of-way. Connecticut seeds "all raw areas".

There is no uniformity as to the rate of seeding. Amounts vary with the soil, the climate, the seed, and no doubt the financial condition of the road agency concerned. Some states employ as little as 20 to 30 pounds of seed per acre. Two states—Rhode Island and California—report the use of 200 pounds per acre. California says its rate ranges up to 300 pounds per acre. The average runs from 60 to 80 pounds.

What kinds of grasses and legumes are used? Allowing for agricultural differences and widely varying climatic conditions, there is a definite uniformity in the seed types. Almost every state uses such standbys as Kentucky blue

and the various fescues, bromes, red-tops, Lespedezas, ryes, and clovers.

In a few states, seeding is still done by hand. But machine sowing is becoming increasingly popular. Many different seeders are in use. Some

states use standard agricultural seed-ers, while several have now developed units which spray a mixture of seed, fertilizer, and water on slopes or road-side areas.

(Continued on next page)

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Now, more than ever, it pays to look upon your truck purchase as an investment...one that should yield you long-term dividends in dependability and economy. Measured that way, you'll find there's no other truck to match a Mack.

Long-lasting, profit-making Mack performance is well demonstrated by Mack Model A-40 Series (23,000 lbs. g.v.w. to 53,000 lbs. g.c.w.) which cover a wide utility range as trucks, tractors, four or six-wheelers.

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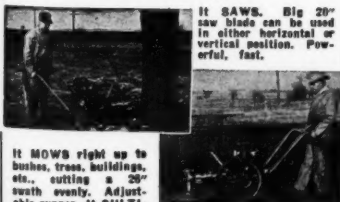
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Mack Model A-405 has won outstanding recognition as a rugged, dependable dump truck. This hard-working six-wheeler is operated by Bongli Cartage Co. of Chicago, Ill.



The BACHTOLD MOWER with attachments does more jobs



It SAWS. Big 20" saw blade can be used in either horizontal or vertical position. Powerful, fast.

It MOWS right up to bushes, trees, buildings, etc., cutting a 20" swath evenly. Adjustable runner. It CULTIVATES almost any kind of soil.

• Easy starting • Finger-tip control • Portable • Compact • Fully guaranteed • Push-type and self-propelled-type models

BACHTOLD BROTHERS, INC. Forrest, Illinois



Ohio Dept. of Highways Photo

Among the machines specially developed for roadside work is this Byers seeder-fertilizer-roller, shown here in service in Ohio.

Erosion Control Pays Big Double Dividend

(Continued from preceding page)

Wyoming apparently has the seeding problem well in hand. "Numerous miles of Wyoming highway are constructed in the plains," the state reports, "and borrow pits are quick to reseed themselves with natural grasses." In sand soils, however, the road agency finds it necessary to plate some sections to prevent wind erosion. Plating is done with heavy clay, which is immediately seeded with crested wheat grass and/or yellow sweet clover. In irrigated farming districts, the state and adjacent property owners frequently cooperate in roadside seeding. The farmers plant hay seed and in return draw the privilege of harvesting the crop. In other areas, the state provides the seed—or even does the seeding—and the farmer takes over at harvest time. This arrangement seems satisfactory to all concerned.

Thirty-three of the 35 states nurture their seed with fertilizer. Most of them employ commercial fertilizers, with the formula differing to meet local conditions. A few states use manure, or a combination of manure and commercial fertilizer. In Washington, the fertilizer is a combination of manure and green mulch.

As to the amount of fertilizer used, there was a wider divergence here than in any other phase of work covered by the survey. Some states use as little as 40 to 60 pounds of fertilizer per acre. About half the states use 1,000 pounds or more. Alabama reported between 1,000 and 3,000 pounds per acre. The amount of fertilizer generally ran higher in the southern states than in other sections.

Mulching

There was a marked uniformity in the use of mulches. All but three of the erosion-control-minded states use

mulch. Florida happily finds that its climate makes the use of mulch unnecessary; the other two states may have similar good fortune, but they did not explain.

Throughout the country, hay and straw are the most popular mulches. The typical state uses hay and straw along with whatever mulches are abun-



Connecticut State Highway Dept. Photo

This machine was developed by the Connecticut Highway Department for seeding roadside areas and slopes.

dant locally—such as tobacco stems in Virginia, peat moss in New Jersey, and sawdust in Oregon where lumbering is a major industry. Louisiana, inci-

dently, is using sawdust experimentally as a conditioner. Pennsylvania sums up the approach followed

(Continued on next page)

THE SEAMAN DOES MORE THAN MIX— IT BLENDS THE COARSE AND FINES!

A road mix may be excellent from the standpoint of coverage or distribution of binder but more than that is essential to obtain the highest possible load bearing value.

The coarse aggregate must be proportioned and distributed uniformly throughout the base.

The fines must fill the voids throughout as a uniform blend, for if segregation of fines and coarse occurs the base will ravel under traffic and become greatly weakened.

This accurate balanced-blending is accomplished automatically by the SEAMAN MIXER. That is why SEAMAN-mixed base courses are superior—whether of bituminous construction, soil-cement, or of any of the many excellent stabilization methods in use today.

That is also the reason why macadam construction, long greatly curtailed because of the high cost of hand labor formerly needed, is becoming widely popular again. The SEAMAN automatically produces the highest type of macadam base at 1/10 to 1/5 the cost of hand brooming. This has been proved by actual road construction.

In road-mixing of any type the SEAMAN completes the work at a highly profitable saving in time—and does a vastly superior job because it blends as it mixes.

So, do all your mixing with the SEAMAN.



Typical cross section of a SEAMAN-mixed base before compaction showing the uniform proportioning and blending of coarse and fines from bottom to surface of the mix. Notice the light blanket of fines at the surface which the SEAMAN automatically produces.

SEAMAN PULVI-MIXER ON AIRPORT CONSTRUCTION—Mixing aggregate macadam. Note even blend of coarse and fine aggregates behind SEAMAN.



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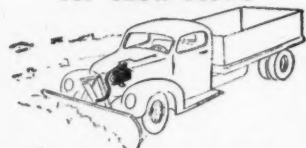
100 pages of up-to-the-minute information about all types of bituminous, soil-cement and other stabilization processes. Send for it now.

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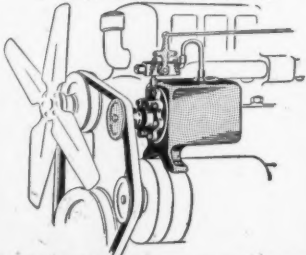
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MODELS

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by many states: "hay on slopes, straw on level areas."

The other mulches used include brush, chaff, hyperhumus, grass clippings, roadside cuttings and mowings, cottonseed hulls, alfalfa, muck, asphalt, and oil. Mulch, in short, is where you find it.

There was only a light state-to-state variance in the rate of mulch application. Virtually every state reported the use of 2 to 4 tons per acre, 1 to 2 inches in depth. New Hampshire spreads mulch to a depth of 6 inches and then pegs it down.

A number of the states use machines for mulching, though one state reported that after trying two or three machines, it discarded them in favor of hand labor.

Sodding Limited

Only a few states are engaged in extensive sodding programs other than in connection with new construction. It was difficult to obtain a clear picture of the scope of these programs, however, since many states included the work done by contractors on new construction, while others undoubtedly did not. The average annual amount of sodding done by the various states ranged from "none" in many cases, up to 500,000 square yards in Michigan and 800,000 square yards in Alabama. Oklahoma reported an average of 500 miles of roadsides sodded each year.

The states were asked whether their erosion-control work is done by contract or state force account, and whether it is done by machinery or hand labor. Many states cryptically replied "both" to each question, but where a preference was stated, a very slight majority favored contract work and an equally small majority leaned toward machinery rather than hand labor. If a general picture can be drawn, it is this: Where slope stabilization and erosion-control work are done in connection with new construction, it is generally part of the over-all contract and is handled by the contractor under close state supervision. In most other instances the work is handled on a force-account basis.

Better than half the states use both machinery and hand labor, depending on the work to be done. A wide range of machinery is in use. Often it is simply regular road-building or farming equipment. In other instances it has been specially developed by the highway departments.

Sodding is difficult to mechanize completely, the survey indicates. Texas does almost all its sodding by machine, but finds it necessary to employ some hand labor on block or solid sodding. Several states have found they prefer to cut sod by hand. Michigan lifts its sod with a cutter and places it with a hand conveyor belt, used in some instances to distribute sod on slope surfaces.

Plantings

Turning to another phase of erosion-



Virginia Dept. of Highways Photo

Virginia uses this blower to place mulch on slopes prior to seeding and fertilizing with a spraying machine.

control work, CONTRACTORS AND ENGINEERS MONTHLY found that 28 states go in for ground-cover planting, but the effort is generally limited because of

the high cost. On the basis of 5-year annual averages reported, Pennsylvania leads the field in yardage of ground-cover planting. In the Quaker State, an

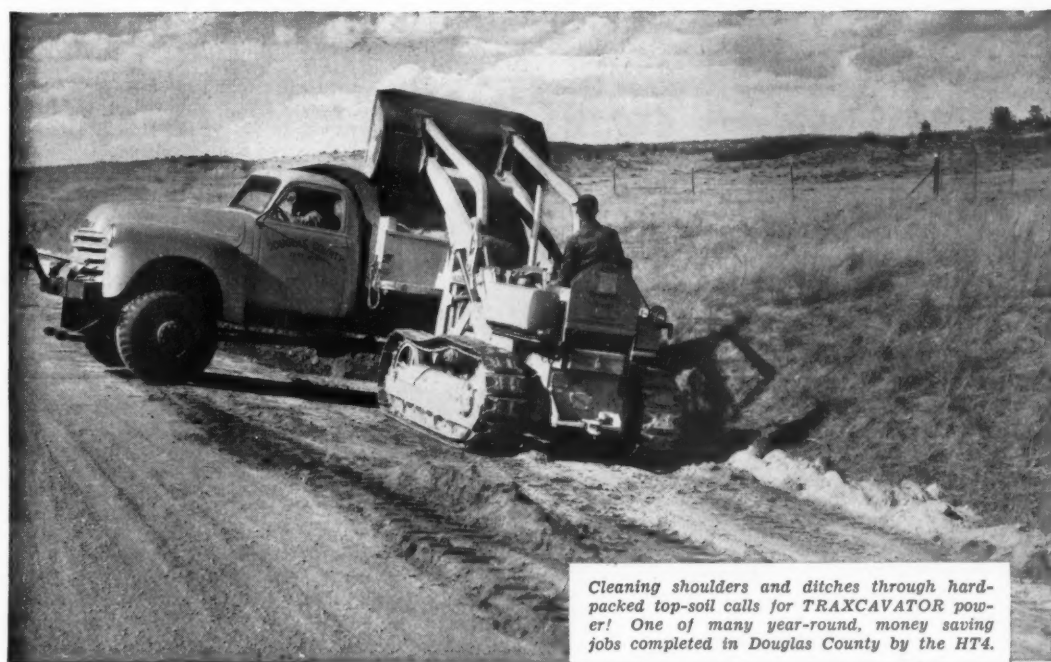
average of 527,233 yards has been planted each year with small shrubs and other plants.

It came as no surprise that hardy honeysuckle is the most popular ground-cover plant. Its use for this purpose is just about nation-wide. Other plants used for ground cover include kudzu, various vines and grasses, blueberry, American bitter-sweet, ivy, and Bermuda sprigs. The latter are particularly popular.

Are trees and shrubs in wide use for erosion-control purposes? Apparently not. Only 8 states said they employ them in their erosion-control programs. More generally, they are planted for the sake of appearance or as an aid to highway safety—especially on divided highways. In Minnesota, trees and shrubs are used to form living snow fences.

Indiana plants more trees and shrubs for erosion control than any other state. It reported an annual average of 2,000 plantings, and said the program was

(Concluded on next page)



Cleaning shoulders and ditches through hard-packed top-soil calls for TRAXCAVATOR power! One of many year-round, money saving jobs completed in Douglas County by the HT4.

YOU NAME IT A TRAXCAVATOR WILL DO IT!

Whatever your job, digging, loading, grading, 'dozing, excavating, stripping, backfilling, land-clearing, ditching, snow-removal—whatever the material—a TRAXCAVATOR will do it... faster and cheaper.

Douglas County, Colorado, uses their versatile HT4 TRAXCAVATOR to clean shoulders and ditches, feed sand and gravel to a screening plant as well as many other jobs throughout the county.

Converting dependable "Cat" Diesel Tractor power to work-power, these economical and rugged tractor-shovel teammates are designed to meet any task. Powerful digging action gets heaped loads every pass... balanced design... wide tracks allow high gear hauls... positive dumping gets all the material out of the bucket... high lift gets the load into any hauling unit. And the rear of the tractor is free for drawbar work or installation of other equipment.

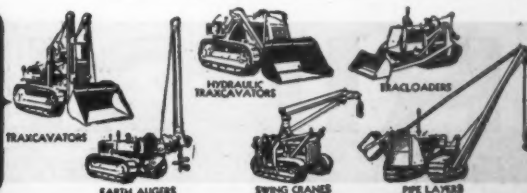
There are five TRAXCAVATOR models with capacities from 1/2 to 4 cubic yards... with a full line of attachments to increase job range! See your TRACKSON—"Caterpillar" Dealer or write TRACKSON COMPANY, Dept. CE-91, Milwaukee 1, Wisconsin.



Digging and feeding pit-run gravel to the screen hopper, this hydraulically controlled HT4 TRAXCAVATOR handles over 500 cubic yards a day for Douglas County, Colorado.

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DRAGS **PECKERWOOD** DRAGS
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WIDTH 6 INCHES—IT'S DIFFERENT
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MADE WITH KILN DRIED 6" WIDE
HARDWOOD AND HEAVY SPRING STEEL
WIRES TRIPLE OUT EACH HOLE.
NOT STAPLE SET
THIS IS IT!
ORDER NOW
ILLUSTRATION OF
10-FOOT LENGTH
ONLY \$3.50
RUNNING FOOT F.O.B. K.C., MO.
NOTICE! Our 15' length Unit Drag 3" wide
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SINCE **VAN BRUSH MFG. CO.** 1928
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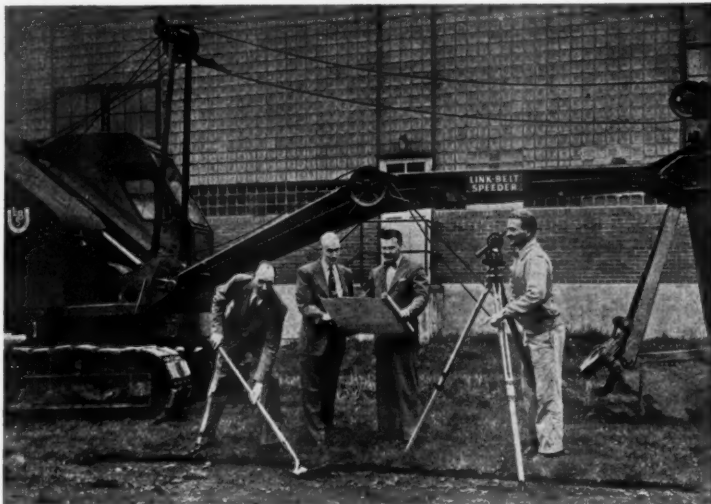
Erosion Control Pays Big Double Dividend

(Continued from preceding page)

designed for erosion control alone. In other states where erosion control was a consideration in tree and shrub plantings, other factors such as appearance and screening entered the picture. Connecticut plants \$30,000 worth of trees and shrubs each year, for purposes "both functional and ornamental".

Other states where erosion control is a factor in tree plantings include Kansas, Maryland, New Jersey, Oregon, Virginia, and Washington.

Despite a wide variance as to methods and means throughout the nation, erosion control is now widely accepted and widely practiced by state highway departments. Though a newcomer to the highway field, it is already a lusty and exceedingly healthy child. And best of all—by reducing maintenance costs it is paying its own way.



It may look like horseplay, but it's ground breaking for a new Pittsburgh Corning plant in Port Allegheny, Pa. Sandwich walls, consisting of two veneers of concrete with a Foamglas core, are a feature of the plant's construction.

summarizes the reports.

Bulletin 35 can be secured from the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C. It costs \$1.50.

Enameled Metal Signs

A recent announcement from Kresky Mfg. Co., Inc., Petaluma, Calif., states that a large portion of its 100,000-square-foot plant has been turned over to the production of baked enameled metal signs. Facilities now include giant presses, shears, bake ovens, assembly lines, and automatic and specially designed painting equipment. The company, which has made over 50,000 highway markers for the California Division of Highways, points out that its geographic position serves to reduce shipping cost to states west of the Rockies. It can supply orders of 200 to 50,000 or more.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 616.

Sandwich-Type Walls Are Glass Insulated

Next month will see completion of a new 20,800-square-foot building in Port Allegheny, Pa. It will house the research and development divisions, and the engineering department, of Pittsburgh Corning Corp. Among its modern features are prefabricated sandwich-type walls insulated with Foamglas.

The concrete walls were cast in-the-flat on the building site and erected on the steel skeleton in various sizes—generally in 12 x 4-foot units. PC officials estimate that this method of construction reduced costs considerably, moved up the completion date, and increased the area of usable space within the building. Another design feature was the use of light-directing glass blocks over a clear, glazed vision strip to give an abundance of evenly diffused daylight.

Lacy, Atherton & Davis of Wilkes-Barre and Harrisburg, Pa., designed the building. Sordani Construction Co., Forty-Fort, Pa., supervised its construction.

Narrow-Median Highways

Seven states report their experience with narrow medians on divided highways in Bulletin 35 of the Highway Research Board. They describe highway site conditions that demanded a narrow median, and highway cross section; they give median details and costs; they discuss traffic volumes, turning movements, speeds, and accidents; and report general conclusions as to the suitability of the design.

Narrow medians were considered to be those 8 feet or less in width. In all, the states give information on 23 different designs of narrow medians. These fall into three general types: those with raised barrier curbs; sloped or rounded mountable medians; and those flush with the pavement, delineated only by markings. The states reporting were California, Connecticut, Illinois, Michigan, New Jersey, New York and Ohio. D. W. Loutzenheiser, Chairman of the HRB Committee on Geometric Design,

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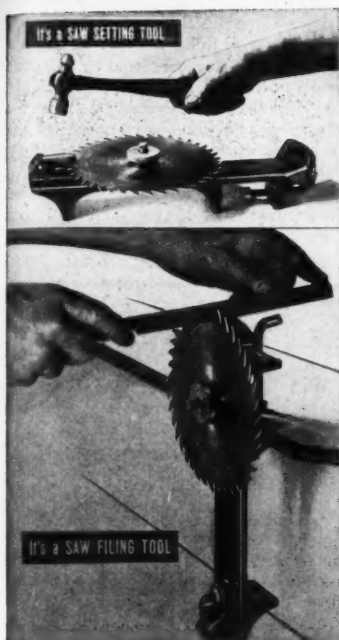
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CONSTRUCTION MACHINERY COMPANIES

WATERLOO, IOWA



The Sharp-Set is a two-in-one tool for setting and filing saw-teeth.

Filing, Setting Tool For Circular Saws

A two-in-one tool for setting and filing the teeth of circular saw blades has been announced by Clark & Sawyer, Inc., 600 Mateo St., Los Angeles 21, Calif. Known as the Sharp-Set, it is adjustable for blade diameters from 6 to 18 inches, and accommodates arbors of all standard sizes and shapes. It can be carried in a tool box and used right on the job.

At one end of the Sharp-Set is a tool-steel "hammer and anvil" matched at 15 degrees to give the saw blade the proper set. The other end has a tension bar for filing the teeth under proper tension. A built-in clamp is available for fastening the saw in a vertical position for filing.

Further information and literature may be secured direct from the company. Or use the Request Card at page 16. Circle No. 626.

AISC Scholarship Winners Announced

The 1951 winners of ten civil engineering scholarships, awarded annually by the American Institute of Steel Construction, were recently announced. The ten winners were selected from a group of 52 high-school seniors nominated by steel fabricating companies for the nationwide competition. The candidates, all of whom took college entrance examination board tests, came from 19 states. Each winning candidate may use his \$1,000 scholarship at any engineering school on the approved list of accredited institutions.

"This scholarship program fulfills a social obligation as well as a practical need," T. R. Mullen, Chairman of the Institute's Committee for Education, said in announcing the winners.

"Engineers qualified to work with structural steel are in constant demand, and our program is designed to help young men who may later choose that field to get the necessary technical education. In addition, the program expresses our industry's recognition that business in this country is operated for the general welfare of the nation and its people, as well as for profit."

The jury of educators which made the final choices included Wesley J. Hennessy, Assistant Dean, Columbia University; Nichol H. Memory, Director of Admissions, Stevens Institute of Technology; and Robert W. Van Houten, President, Newark College of Engineering. Technical consultant was Arthur L. Benson, Educational Testing

Service, Princeton, N.J.

The winners are: Carl H. Albright, Allentown, Pa.; Maurice J. Criswell, Baltimore, Md.; John Frey, Livingston, N.J.; Ronald Haase, Milwaukee, Wis.; Kerry S. Havner, Tulsa, Okla.; Twyman Jones, Missouri Valley, Iowa; Robert Longo, Cranston, R.I.; Elliott B. Perrett, Jr., Pittsfield, Mass.; James H. Rider, Providence, R.I.; and Richard Robbins, Milwaukee, Wis.

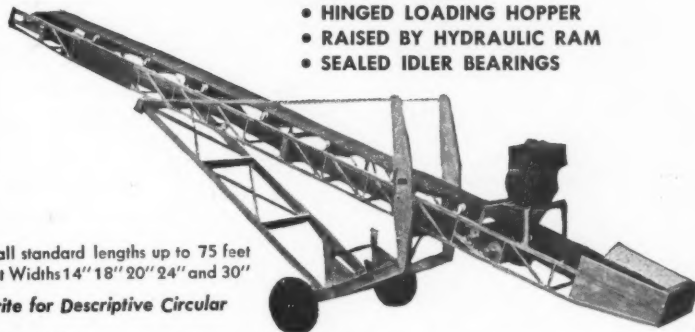
News of Republic Rubber

An 80,000-square-foot addition to its Youngstown, Ohio, plant will be built by Republic Rubber Division, Lee Rubber & Tire Corp. The company hopes to start manufacturing hose there by the middle of next year. During the emergency, all production will be limited to military requirements.

James F. Dollison has joined Republic as Field Engineer. He will headquarter in Youngstown and work in northeastern Ohio and western New York.

NOW AVAILABLE The MASTER STACKER with Hydraulic Lift AT A NEW LOW PRICE

- Special Features
- STURDY CONSTRUCTION
 - LOW OVERALL HEIGHT
 - SWIVEL WHEELS
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In all standard lengths up to 75 feet
Belt Widths 14" 18" 20" 24" and 30"

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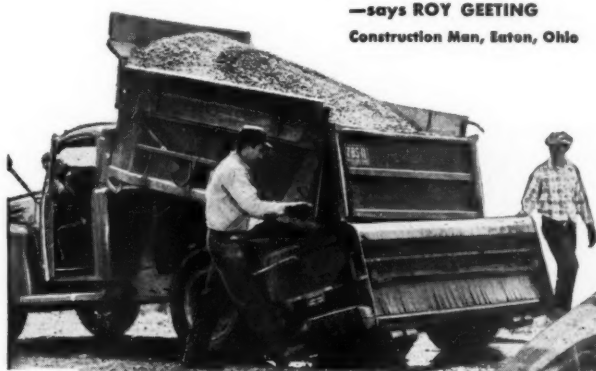
TRIANGLE ENGINEERING COMPANY, 2952 W. 26th Street, Chicago 23, Ill.

OHIO
Report No. 8267



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Over 6 tons of gravel
for only 3¢ a mile!"

—says ROY GEETING
Construction Man, Eaton, Ohio



"My Ford Dump Truck saves me money every mile," says Mr. Geeting. "I save about a dollar a day or almost 300 dollars a year on gasoline alone!"

Contractor Geeting uses his 1950 Ford F-6 Dump for all kinds of roadwork (i.e., hauling sand and gravel, sanding hills, plowing snow). He says, "It's the ideal truck for cramped quarters because it steers and handles so easily."

He entered his truck in Ford's nationwide Economy Run and says: "My Ford traveled 21,003 miles with loads of over 6 tons. Yet it cost only \$637.83 for gas, oil, maintenance and repairs. That's a running cost of only 3.04 cents a mile!"

Like others who rely on Ford for low running costs, Roy Geeting is sold on the money-saving service he gets from his Ford Dealer. For more facts on the trucks that last longer and save you money every mile—mail coupon below.

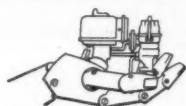


This Ford F-6 Dump for '51, like Mr. Geeting's truck, is a favorite with construction haulers. Power choice of 3 great engines . . . 100-h.p. V-8, 110-h.p. Big Six and 95-h.p. Six. Available with the 5-STAR Cab, or,

at added cost, the 5-STAR EXTRA Cab for more efficient driving, safety and convenience. Single speed rear axle standard, 2-speed axle also available (at extra cost) with wide range of ratios for operating flexibility.

Availability of equipment, accessories and trim as illustrated is dependent on material supply conditions.

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3251 Schoefer Rd., Dearborn, Mich.

Send me without charge or obligation, detail specifications on Ford Trucks for 1951.

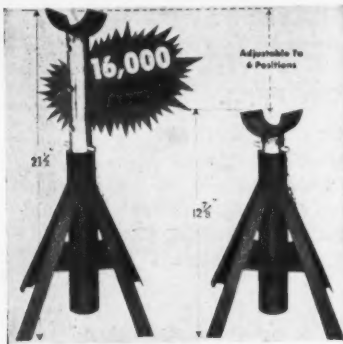
Full Line ☐ Heavy Duty Models ☐
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The new Unit Utility Horse adjusts to six positions.

A New 8-Ton Horse

An all-purpose truck trestle with a 16,000-pound capacity by test has been introduced by Unit Mfg. Co., 1229 Harmon Place, Minneapolis 3, Minn. The Unit Utility Horse is adjustable to six positions using a positive-locking pin arrangement.

A handy work horse for highway department garages, equipment shops, etc., the Utility Horse stands 21½ inches high extended; 12½ inches with the tube sleeve lowered. A 10 x 10 base offers positive footing, and the unit's cylinder sleeve extends 2 inches above the legs for added bracing. The tube sleeve cannot be lowered until the weight is removed. Shop hoists may be reserved for lifting operations by using Utility Horses as stationary supports. A ½-inch steel adjusting pin with a tapered point is permanently attached to a link chain and always at hand.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 673.

Wire-Rope Tightener

A tightener for wire-rope work has been introduced by Quay Industries, 100 Barr Bldg., Washington 6, D. C. Twenty pounds of pressure on the handle are said to apply approximately 500 pounds of pull on the strand or on the wire. The tool is of the T-wrench variety with a slot in the end of the shaft. The slot has an angle of 45 degrees from the plane of the crossbar or handles. The tool comes in two sizes.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 617.

New Plant for Tilden

The Tilden Tool Mfg. Co., producer of Konkrete Kore drills, now occupies a new manufacturing plant at 209 Los Molinos, San Clemente, Calif. The building is a modern one-story structure, fully equipped with up-to-date fixtures and appliances for specialized small-tool manufacture. The former Pasadena plant is retained by the company for divisional sales work, sub-assembly operations, shipping service, and for specialized contract work for national defense.



"... but after all he paid for those remote controls himself..."

Whitton Replaces Brown

In July, Rex, M. Whitton was named to succeed Carl W. Brown as Chief Engineer of the Missouri State Highway Commission.

Mr. Brown had been Chief Engineer since 1936. He joined the Department in 1918 as Office Manager, when road construction in Missouri was in the planning stage.

Mr. Whitton had been Engineer of Maintenance since 1936. He joined the Department as a surveyor in 1920, the year of his graduation from the University of Missouri. He moved from that post to design work, then to Division 4 as Assistant Project Engineer. By 1925 he was Assistant Division Engineer in charge of construction. His next assignment was to Division 10 as Construction Engineer. The same year, 1927, he became Engineer of Special Assignment in the Bureau of Surveys and Plans at the main office in Jefferson City. In 1929 he was promoted to Assistant Engineer of Surveys and

Plans, and in 1933 he was advanced to Division Engineer for Division 8. He became State Engineer of Maintenance in 1936.

Data on Perlite Aggregate

An 8-page catalog detailing the properties, features, and applications of Permalite, a lightweight insulating aggregate, is available from Great Lakes

Carbon Corp., 18 E. 48th St., New York 17, N. Y. The folder describes the use of Permalite for fireproofing, curtain walls, floors and roofs, elevator shafts, stair wells, etc. It covers recommended mixes, applications, fire ratings and insulating qualities. Photographs illustrate typical jobs using Permalite.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 572.

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The standard with contractors for many years.

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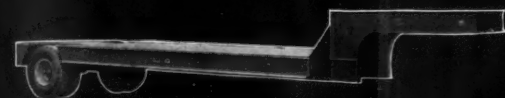
Your **DORSEY** Distributor *Right* HAS THE **LOW BED TRAILER** for your Job!

MODEL MTS — For Road Patrols, Cranes, Shovels, and Draglines up to 35 Tons.



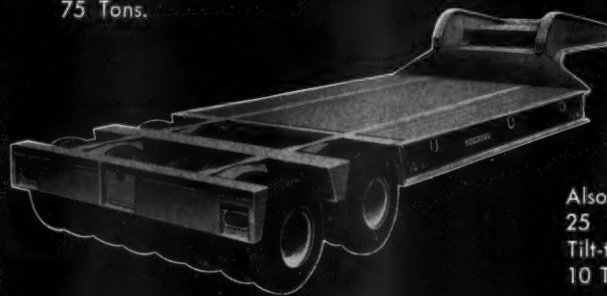
MODEL MTS

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"Makes the Heavy Jobs Light"

Building Foundation Gouged 75 Feet Deep

Excavation Subcontractor Whips Shale Formation to Create Underground Space for 40-Story Skyscraper

• IN a monstrous hole gouged down 75 feet deep through the pale-blue shale under Ervay Street in Dallas, Texas, a skilled crew of foundation specialists is getting ready to start the 40-story Republic Bank Building the other way—toward the sky.

For 90 days, equipment and crews of Vilbig Bros., subbing the foundation excavation from J. W. Bateson & Co., the prime contractor, went down and down through the solid shale formation. The massive excavation was necessary to make room for four important stories of the 40-story bank and office building. These underground stories will house ultramodern parking facilities, a drive-in bank depository, and building service facilities. Lift by lift, Vilbig Bros. has taken the foundation excavation down to rock and beyond.

Tallest in Southwest

According to its builders, the new building will be the highest in the southwest, totaling 600 feet over-all. The building is divided into two main units. There is a 40-story tower section covering an area 116 x 175 feet between Ervay and Bryan Streets. The foundation for this section goes down 75 feet below street level. Connected to the tower section will be a bank and office building fronting on Pacific Avenue. This building, which will be 8 stories high above the street, will cover an area 225 x 150 feet and go down 45 feet below street level.

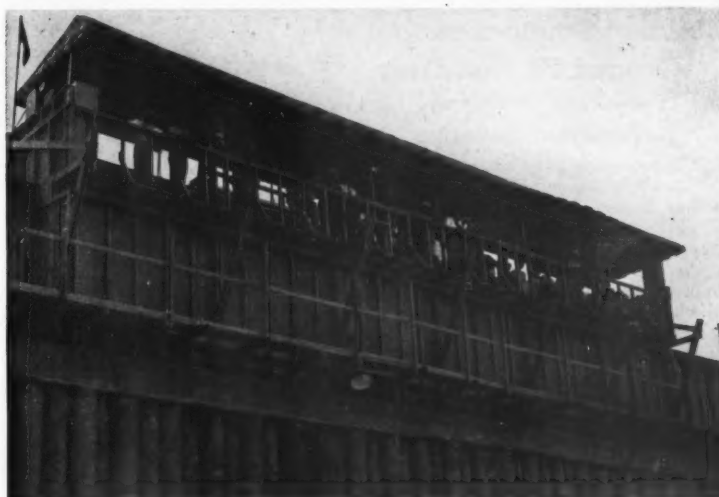
The building was designed by Harrison & Abramovitz of New York, world-noted designer of the United Nations Building. Gill & Harrell of Dallas is the associated architect.

The aluminum exterior of the building, coupled with its height, will make it stand out on the Dallas skyline. The structure is to be equipped with every modern convenience: all-season air conditioning, high-speed escalators and elevators, motor banking, garage service. In the 40-floor tower section there will be 760,109 square feet of floor space, with perfection in lighting and office layout design. Its exterior appearance will be similar to the United Nations Building in New York.

In line with its proposed unexcelled

banking service, Republic National Bank has even erected a Spectator's Stand over the work site, which it keeps open for the public from 8 a. m. to 5 p. m. Monday through Saturday. Known as the SPEMBSE gallery, the stand is humorously dedicated to the Society for the Protection and Encouragement of More and Better Side-walk Engineers. The stand is equipped with red-cushion seats, telephone, an awning to protect SPEMBSE members and soft-drink vending machines.

(Continued on next page)



C. & E. M. Photo

A special observation platform draws hundreds of spectators daily to the Dallas building job for which J. W. Bateson & Co. is the prime contractor. Some of the special bracing around the foundation hole is shown beneath the platform.



Gain extra days this Fall!

RUBBER ASPHALT ROADS

The Proprietor of U. S. A. Patent No. 2138734 relating to Rubber-Asphalt Roads is prepared to sell outright or license highway engineers or others to work thereunder

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52, Park Avenue
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BUY used equipment
SELL used equipment
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DARAKOTE enables you
to continue surface treatment,
cold-patch and repair work
right through the late Fall . . .
despite cold, wet weather!

Highway Departments throughout the country lengthened their paving season last Fall by using DARAKOTE—the anti-stripping agent that makes it possible for liquid bituminous materials to stick to cold, moist aggregates.

DARAKOTE prevents stripping under these adverse conditions, even during heavy Fall rains, by actually displacing the water from the surface of the rock. It permanently binds asphalt to the aggregate and to the road surface. It works equally well with asphalt cements, cut-back asphalts, road oils, road tars . . . on both acidic (siliceous) and basic (calcareous) types of paving aggregates.

Add extra days or weeks to your surface treatment, cold patch and repair season this Fall by using DARAKOTE! Write today for factual literature!

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DEWEY and ALMY CHEMICAL COMPANY

CAMBRIDGE 40, MASS. • CHICAGO 38 • SAN LEANDRO, CALIF. • MONTREAL 32

Building Foundation Gouged 75 Feet Deep

(Continued from preceding page)

Foundation Bracing

The new bank building is surrounded by other important buildings. Just across Bryan Street stands the big U. S. Post Office Building. A layer of clay about 18 feet deep overlies the shale formation, and tremendous super-imposed loads on all sides made it absolutely imperative that this clay formation be supported from caving or shoving under any circumstances.

Before turning Vilbig Bros. loose on the foundation excavation, the Bateson organization let a subcontract to Sure Bottom Foundation Co. of Houston for the installation of concrete bracing all around the hole.

Using a rotary drill rig mounted on a truck, Sure Bottom first drilled 18-inch-round holes on 1-foot 6-inch centers through the clay layer and 8 inches into the shale rock. These holes were then fitted with two 1-inch-round bars of reinforcing steel, and poured to the top with truck-mixed concrete. Directly behind the rows of columns the alternates were then drilled and poured in the same manner, to make a continuous mass of concrete curtain wall surrounding the proposed excavation.

Directly back of the top of this wall, every 8 feet, a battered hole was sunk back under street level, and under-reamed. This brace column was reinforced and poured in the same manner, so the piece of reinforcing steel protruded and met the steel from the vertical columns. A 36-inch concrete cap was then formed and poured to tie



C. & E. M. Photo

A Bucyrus-Erie Doser-Shovel claims up broken rock in the Republic Bank Building excavation. That's General Superintendent F. L. Kaiser in the background, and Drilling Superintendent Roy Haralson with his back to the camera.

in the tops of all vertical and brace-row columns.

When foundation excavation had reached the bottom of the vertical columns, anchor rods were grouted into the shale formation by drilling a hole through the column and into the rock. This tied the columnar wall top and bottom and made it sufficiently strong to prevent any movement from the nearby loads.

Heavy Excavation Job

Vilbig's excavation job is one of the biggest ever attempted for a Dallas building. The job calls for removal of 65,000 cubic yards of rock — enough

material to build a highway subbase a foot deep, 20 feet wide, and 14 miles long. Vilbig's operations are under the supervision of Roy L. Haralson, a grizzled old veteran of many a blasting job. His long suit is powder, and he knows how to handle it. Haralson is the type of powder expert who can handle a blasting job of this type with 50 feet of lead wire on his blasting machine.

The initial earth was mucked out by an ancient Northwest 104, loading to a fleet of from 15 to 24 5-yard dump trucks. A disposal area in West Dallas, about 3 miles away, received all the material, which is being used to reclaim some unsightly gravel-bed excavations and make new land again.

The main block of shale was excavated in 6-foot lifts. A Schramm wagon drill and 4 assorted jackhammers did the drilling, with the wagon-drill machine used in all but the most inaccessible places. The shale was bedded in flat planes, and was filled with typical

(Concluded on next page)

YOU ONLY GET YOUR MONEY'S WORTH
WHEN THE *Blade* WORKS RIGHT

WARCO is the ONLY motor grader whose blade...entirely cab-controlled...attains all working positions. Other graders rely on manual adjustment to reach many positions. That's how **WARCO** cuts "dead-heading"... reduces manual adjustment down-time...increases profits.

Let your **WARCO** dealer demonstrate NOW....

WARCO 4D-100 Motor Grader
Heavy Duty 100 H.P.
WARCO 4D-76 Motor Grader
General Duty 76 H.P.

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crustaceans, mollusks, giant snails, and other solidified forms of ancient marine life. The material drilled easily, with the exception of spotty outcrops of ferrous sulphide, which is particularly hard on drill bits.

Timken steel with ordinary rock bits was used on the machines. The hole pattern consisted in all cases of a 6-foot grid, with one row as close to the sides of the foundation as the machines could drill. The foundation cut through both rock and earth was made vertical, with no bank slope.

When six holes were drilled, powdermen loaded each 6-foot hole with 3 pounds of Hercules 2X Gelamite. On each shot, a delay was used for every hole but the first to minimize blasting shock. Wire-mesh mats were used over the first shots near the street surface, but Haralson is such an expert that this was discontinued when the cut got deeper. A small hand-plunger blasting machine set off the shots, which loosened the formation so it could be dug by the Northwest dragline. The delays were always arranged so the hole next to the solid bank was the last to go.

A seismograph machine was set up on the job site, and no shock wave ever disturbed the machine. The bottom of the tower foundation was reached, 75 feet below street level, without even a threat of any liability on the part of the insurance company.

Several major faults were uncovered as the excavation went deeper, however. One big fault, directly across from the post-office building, was underpinned with concrete as a safety measure. Good flows of ground water were also found. Wherever it was possible to do so, the subterranean flows were intercepted by pipelines and carried to sumps in the excavation, where Carter and Homelite pumps carried the water away to street-level outfall sewers.

One of the permanent features about the building, which will take care of this water problem, is a perimeter French drain far beneath the street. Water entering this drain will be trained into a foundation sump, where a small electric-driven permanent pump can keep the sump unwatered.

Excavation, drilling, and blasting went forward 7 days a week 12 hours a day. Traffic in downtown Dallas is so bad on Saturday that very little mucking was done on that day. One of the big reasons for Sunday work was the fact that the streets were fairly well deserted and the crew saved on dump trucks that day.

The pouring of heavy concrete footings in solid rock and structural-steel erection were scheduled to start later in the summer. By June, Vilbig's men were already gouging out about 1,800 cubic yards of rock excavation in these foundations. It was a hard, bruising job with Cleveland and Ingersoll-Rand pneumatic machines and moil points. As the pieces were gouged loose, laborers shoveled them up to the main excavation floor where a Bucyrus-Erie Dozer-Shovel could pick them up and carry them over to the dragline. The moil-point work was an indication that the end of excavation, at least in the tower section, was in sight.

Even the final hand-chipping of the foundation walls, which was done by small pneumatic chisels held by two men on a boatswain's platform, was about finished. The walls were almost as smooth as the sides of a piece of building stone.

All in all, this foundation is one of the most spectacular and dangerous foundation jobs pulled off in recent years in any Texas city. The fact that this was done without a hitch is a tribute to the skill of architects, supervisors of both the Bateson and Vilbig companies, and of the men who handled the drilling and excavating equipment.

Field supervision for J. W. Bateson

Co., Inc., is the responsibility of Paul L. Kaiser, General Superintendent. J. M. Wooten represents Harrison & Abramovitz and Gill & Harrell, the architects.

Six Units Make Up New Engine Analyzer

Six separate King testing units—a coil ignition tester, spark-plug tester, condenser tester, VAR tester, cam-angle tachometer tester, and an exhaust-gas analyzer—form the Model MT-225 engine analyzer announced by King Electric Equipment Co., 9123 Inman Ave., Cleveland 5, Ohio. The six units lock in place on a rack in a portable cabinet, though each analyzer can be removed for independent use in any part of the shop or for field or road testing.

Each King tester has large 5-inch D'Arsonval meters for rapid accurate readings. Permanently attached leads are designed to eliminate electrical

losses. The heavy-gage streamlined cabinet provides convenient table space for small tools and parts. Its storage compartment has a partitioned battery space. It is mounted on large smooth-running easy-swiveling wheels with foot-operated locking brakes. The top

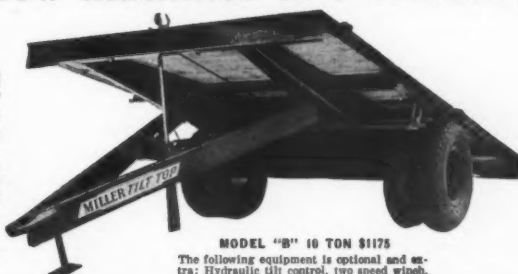
section of the cabinet is available separately for wall or bench mounting where space is limited.

Further information may be secured direct from the company. Or use the Request Card bound in at page 16. Circle No. 624.

MOVE slow machines in a HURRY!

on a fast loading MILLER Tilt-Top

There's no lost motion with a MILLER. Self-powered equipment walks right onto the tilted platform—practically loading itself. Hauling becomes a ONE man job, saving valuable man hours as well as cutting non-productive time for slow moving machines. Although low in cost MILLER Tilt-Tops are carefully engineered and ruggedly built. Standard platform is 14' x 8', optional 16' available. Platform, tires, Timken bearings, pintle eye and dual Budd wheels are all standard equipment.



MODEL "B" 10 TON \$1175

The following equipment is optional and extra: Hydraulic tilt control, two speed winch, electric brakes. IMMEDIATE DELIVERY.

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Cement Treatment, California Style

By RAYMOND P. DAY, Western Editor

C. & E. M. Photos

• NO highway is better than its base. Long familiar with that principle, the California Division of Highways is now financially able to do something positive about it. This picture series shows how base material is often strengthened by the addition of portland cement, when for one reason or another, other sub-base material is not available.

State Route 18, just west of Corona, is being rebuilt to dual-highway standards. Peter Kiewit Sons' Co. of Arcadia has 4.9 miles of the improvement, at a contract figure of \$446,000. These pictures show how Kiewit's men and equipment streamline what is primarily a rather tedious lab operation.



1. To start with, a Gardner cement mixer truck, hauling cement from a mill at Riverside, 15 miles away, spreads the cement into windrows which have been divided and shaped by motor graders to yield 6 inches of compacted, stabilized base. V. P. Hunt Co. hauls the cement from a mill at Riverside, 15 miles away.



2. Two Gardner mixers move in. The first pass by the two rigs will blend the fresh cement with base soil in the windrows.



3. and 4. We switch the camera to the front of the lead Gardner mixer to show how neatly the cement meter has injected the material into the windrow. Then we cut around to the rear of the second machine to show the fine texture of base material after the dry mixing is finished.



5. The windrow is now ready for the injection of water. This 3,000-gallon tank truck hauls from the Corona city water supply. Hooked by hose to the Gardner mixer, it furnishes all the moisture at one pass.

6. The ground mediate Note h each of

7. With Caterpi moves

8. And ballaste pack er tire 6-i lays it

9. The fic lane this on shapes median

10. All dinarily sion ta is used shaped ized la It will for the form t

6. The Gardner mixer in the foreground is delivering a final mix, immediately behind the water injection. Note how closely the machines follow each other.



7. With the road-mixing finished, a Caterpillar No. 12 motor grader quickly moves in to knock down the windrows.



8. And rolling begins. Two heavily ballasted Bros Wobble Wheel rollers pack enough punch to compact the entire 6-inch base after the motor grader lays it down.



9. The rollers keep at the 24-foot traffic lane for about an hour. Up ahead of this one, the Caterpillar motor grader shapes the ditch line along the freeway median.



10. All done. Smooth as velvet. Ordinarily a distributor applies this emulsion tack coat, but here a hand outfit is used to fill in around a few odd-shaped transitions. The cement-stabilized lane will resist 700 psi in 28 days. It will be ready in less time than that for the asphaltic-concrete courses which form the paved surface.



Contractor Unwaters Huge Meadow Lagoon

A lot of people would have appreciated a few hundred million gallons of extra water during the past summer. But "Dick" Dinallo, President of Terminal Construction Corp., Wood-Ridge, N. J., wasn't one of them. His crews had the job of unwatering a 43-acre lagoon before preparing the area for use as a sludge-driving bed for the new Little Ferry Sewage Treatment Plant in Bergen County, N. J. (See C. & E. M., May, 1951, Pg. 64.)

The lagoon was about 40 feet deep in the center and contained approximately 300,000,000 gallons of water. At the nearest point it was about 100 feet from the Hackensack River. This and the low-level nature of the land both helped and hindered the contractor. It meant that his pumping distance was short; but at the same time he had to worry about back-flow from the marshy area nearby. This was solved by building an earth dike around



C. & E. M. Photo

Moretrench pumps on a 10 x 10 float unwater a 43-acre lagoon in New Jersey; the area will be turned into a sludge-drying bed for a sewage-treatment plant. The pipelines were floated out to the lagoon banks on empty 50-gallon-drum pontoons.

the entire perimeter of the lagoon.

Two 12-inch Moretrench pumps, powered by GMC 4-cylinder diesel

engines, did the unwatering. Both were mounted on a 10 x 10 float. Each of the 12-inch steel pipelines was floated to the lagoon banks, using empty 50-gallon drums as pontoons. The lines brought the water up to an open ditch leading to the river. The pumps operated on a continuous 24-hour basis and delivered 8,500 gpm—about 12,000,000 gallons per day.

After unwatering, the bottom was sealed against local springs. Construction of the sand bed, drains, and pumping station was started soon afterwards.

The job was part of a \$4,250,000 contract for the construction of a new sewage-treatment plant for the Bergen County Sewer Authority. Pumping operations were directed by Pete Lojewski, John Dioguardi was General Superintendent; Robert Lincoln, Resident Engineer.

Paint Repels Water

A new paint based on Bakelite polystyrene emulsion and designed to serve as a moisture-protective as well as decorative coating is manufactured by Marvelite Paint Co., 1237 Light St., Baltimore 30, Md. Nulon-X has been used on concrete, cinder-block, stucco, brick, and plaster interior and exterior walls.

The paint may be sprayed, brushed, or rolled on. The first coating dries in 20 minutes and is ready for recoating in an hour, the producer says. It is designed to close up moisture-admit-

ting pores in the wall and dry to a tough, long-wearing finish. Available in a clear, colorless coating as well as in a variety of colors, the paint is packaged in quart, gallon, 5-gallon, and 55-gallon containers.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 607.

Elevator, Hoist-Tower Data

Revised information on the Waco portable elevator and material-hoisting tower has been put out by Wilson-Albrecht Co., Inc., 3565 Wooddale Ave., Minneapolis 16, Minn., in the form of 2-color 8½ x 11-inch catalog inserts. Sheet No. PS-28P-7-51 deals with the elevator, and sheet No. PS-28C-7-51 with the hoisting tower.

This literature may be obtained from the company, or by using the Request Card at page 16. For data on the portable elevator, circle No. 630; on the material-hoisting tower, circle No. 631.

The Greatest News For Electric Drill Users



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SUPERDUTY 1/4" PORTABLE Electric Drills—Standard Duty, Heavy Duty, and Extra Heavy Duty Models; each available in 8 speeds, 500 to 5000 rpm. Choice of pistol or saw type grip. 48 styles and models.



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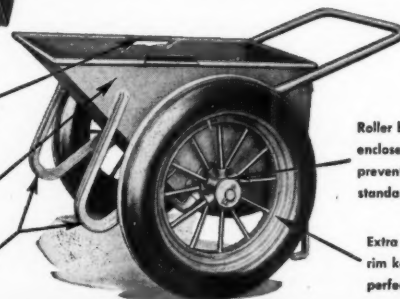


Investigate the unusually sturdy construction of this perfectly balanced cart. It's the best that money can buy. Outlives any other cart. That's why it costs less. Choice of 30" dia. steel wheels or pneumatics. Illustration shows No. 626-PR Cart with dumping rockers and pneumatic tires, 6 cu. ft. capacity, water full. Eight other models. Write for Catalog No. 63.

Top edge reinforced with continuous 1/2" dia. butt-welded rod.

Tray is made of 14 gauge steel.

1 1/4" T-iron rockers facilitate dumping and cleaning out.



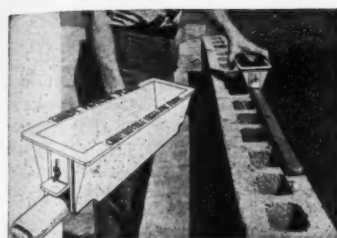
Roller bearings, enclosed in cage to prevent locking, are standard equipment.

Extra heavy steel rim keeps wheel in perfect alignment.

Look for this Mark of Sterling Quality

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Sterling WHEELBARROWS



The Mortar Plane is designed to lay mortar on concrete or cinder blocks four times as fast as conventional trowel methods.

Mortar-Placing Tool

A 1½-pound aluminum tool designed to lay mortar on concrete or cinder block four times as fast as conventional trowel methods has been developed by Kakest Co., Curwensville, Pa. The manufacturer says anyone can use the Mortar Plane and it saves 10 per cent of the mortar and 50 per cent of the labor usually necessary.

The proper mix of mortar is poured into the Mortar Plane. Then the device is shaken and moved along the block on its guide. Mortar is ejected through its rear gate, which regulates the thickness of material desired for various types of block.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 565.

Mathematical Data Book

A newly revised 176-page looseleaf book containing tables and formulas for solving problems in arithmetic, geometry, algebra, trigonometry, analytical geometry, and calculus has been announced by Lefax Publishers, Philadelphia 7, Pa. The material is arranged in six thumb-indexed sections for ready reference. It covers mathematical reviews; squares, cubes, square roots, cube roots, reciprocals, areas, and circumferences, etc.; five-place logarithms of numbers; five-place logs of trig functions; five-place natural trig functions; and hyperbolic functions.

The book may be obtained for \$1.50 by writing to Lefax Publishers.

Safety Men Elect Officers

At its annual June meeting the Industrial Safety Equipment Association re-elected Charles H. Gallaway of American Optical Co. as President, Earl H. Brooks of Safety Clothing & Equipment Co. was elected Vice President, Jess A. Brewer, Industrial Gloves Co., and G. M. Glidden, Acme Protection Equipment Co., were elected to the board of trustees.

President of Aluminum Ladder

D. D. Cramer, formerly Vice President, has been elected President of Aluminum Ladder Co., Worthington, Pa. He succeeds S. H. Carbis, founder of the company, who died in April. H. J. Mudd, General Manager, has been elected Vice President.



Improves Operation Of Diesel Equipment

A combined oil-heat-exchanger and oil-clarifier for diesel equipment has been announced by The J-B Engineering Co., 440 Seaton St., Los Angeles 13, Calif. It is said to assure constant lubricant viscosity under practically all operating conditions.

The exchanger is available in two sizes, said to be sufficient for all equipment in the diesel power field. The unit has an outside diameter of 10 inches and measures 30 inches in over-all length. It is completely finned and encompasses a large surface area for the dissipation of excessive engine-oil temperatures. The device has a replaceable filter cartridge designed for a long service life.

The use of the combination oil-heat-exchanger and oil-clarifier is said to result in a stabilized lubricant viscosity, a clean engine, conservation of horsepower, decreased condensation, decreased wear of engine parts, and conservation of fuel and oil.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 567.

Gregg Returns to ARBA

After an absence of two years, Norman W. Gregg has returned to the American Road Builders' Association. As Editor of Publications, he will handle all aspects of ARBA's public relations. Mr. Gregg was with ARBA from 1944 to 1949.

Air-Cooled-Engine Line

Complete specifications, power curves, dimensions, and engineering data are given for the heavy-duty air-cooled engines manufactured by Wisconsin Motor Corp., 1910 S. 53rd St., Milwaukee 46, Wis., in Bulletin S-130. These power sources are available in single-cylinder units rated at 3 to 9 hp, and in 2 and 4-cylinder units rated at 7 to 30 hp. Many of the Wisconsin heavy-duty service features are pointed out in the bulletin. Also included is a list of Wisconsin engine distributors throughout the world.

This literature may be obtained from the company, or by using the Request Card bound in at page 16. Circle No. 576.



Operators in increasing numbers tell us that Marmon-Herrington All-Wheel-Drive Fords are the fastest snow-removal trucks your money can buy—yet they cost you less than any other multiple-wheel-drive trucks on the market.

The pictures above show Marmon-Herrington All-Wheel-Drive Ford Trucks clearing deeply drifted roads in northern Wisconsin and Minnesota. Here are typical owner comments: *Truck has amazing power and traction—Plows deep, heavy snow with no effort at all—Makes more trips a day than the heavier all-wheel-drive it is working with—Does same work as a 10-ton all-wheel-drive in gravel hauling—Recommend it to any highway department for snow removal and all-around work.*

Marmon-Herrington offers the widest range of All-Wheel-Drive Ford models—95, 100, 110 and 145 hp. engines—a model of the right size and capacity for every snow-removal requirement. Let your Marmon-Herrington dealer show you the model that's exactly right for your local needs.

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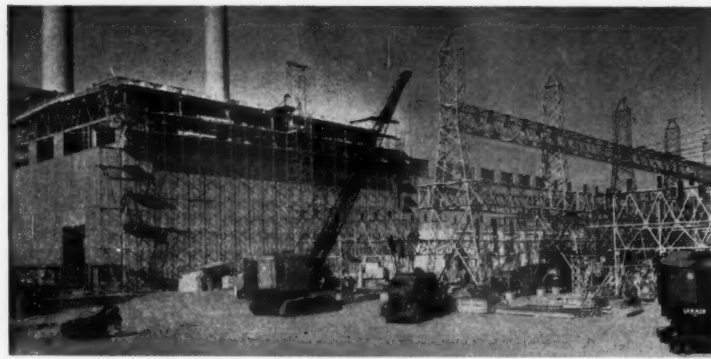
FORDS

Precast Roof Deck For Power Station

Savings in time and cost by using precast concrete slabs for roof decking of the new O. H. Hutchings power station at Miamisburg, Ohio, have been reported by C. Russell Dole, Architectural Engineer of The Dayton Power & Light Co., Dayton, Ohio. Direct comparisons of cost were possible since a poured concrete roof was installed on Units 1 and 2 and a precast concrete slab for Units 3 and 4.

Construction was started in 1949 and will be completed in 1952. The power station is designed as a semi-outdoor boiler plant with a rated capacity of 360,000 kw. The structure is a steel frame with masonry walls, concrete floors, and glazed tile interior walls.

Mr. Dole reports that the precast roof of Flexicore slabs cost 92 cents per square foot, installed and grouted in November, 1949. The cost of a poured deck, he says, would have been approximately \$1.25 per square foot at



Units 2 and 3 of the new O. H. Hutchings power station, Miamisburg, Ohio, under construction. The project was started in 1949 and will be completed in 1952.

that time. The saving amounted to \$6,877 on the 20,840 square feet placed on the turbine-room roof.

Placing the slabs was begun as soon as the steel frame was up. Two weeks later over 20,000 square feet of precast concrete roof decking was in place, providing shelter for the workmen engaged in placing floors and building forms for the turbine foundations below. If poured construction had been used, Mr. Dole states, one month would have been required just for building the forms. With winter weather setting in, concrete pours would have been a problem because of the difficulty of protecting the concrete from below. The use of precast slabs also eliminated the fire risk of form work set high in the steel.

The slabs are 11 feet 11 inches long and 6 x 12 inches in cross-section. To reduce the dead weight, each slab has two parallel hollow cores, 4½ inches in diameter, through its length. The steel reinforcing rods in the slabs were prestressed during the manufacturing process. Grout was poured between the slabs to form a key that locks the entire roof into a rigid unit. The total weight of the slab and grout is 40 pounds per square foot. Additional roof treatment consisted of a 1-inch fiberboard insulation plus a 20-year bonded tar-and-gravel roof.

A Flexicore roof was also placed on the auxiliary building between the turbine room and the boiler room, and will be used on power Units 5 and 6 which will be completed in 1952. The Dayton Power & Light Co. of Dayton, Ohio, is owner of the plant; Elasco Services of New York, the designer; and the Maxon Construction Co. of Dayton, Ohio, the general contractor. The Flexicore slabs were furnished and installed by The Flexicore Division of Price Bros. Co., Dayton, Ohio.

Plans to Cut Accidents

An intensified safety program has been launched by the National Constructors Association, which is made up of companies engaged primarily in the construction of chemical plants, petroleum refineries, and steel mills; all are participating heavily in the defense construction program.

Each member company will receive a base rating for accidents according

to its record between January 1 and September 30 of this year. October 1 begins the award period during which companies can qualify for safety awards by reducing their accident frequency and severity ratings below those established in the base period.

The amount of reduction required is still to be determined, but the Association hopes to reduce accidents as much as 20 per cent by the first of the year. The Association will also get out a safety manual based on the experience of members and data developed by the National Safety Council.

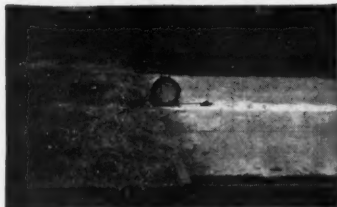
F. R. Griffin is Chairman of the NCA Safety Committee.

Solving Floor Problems

"Over the Rough Spots" is a new pocket-size 32-page booklet analyzing flooring problems. Graphically illustrated, it tells how to look for and how to correct bad floor conditions. It tells how to protect both concrete and wood floorings and how to maintain proper repair by comparatively unskilled workmen.

This literature is available from Stonhard Co., 525 Stonhard Bldg., 1306 Spring Garden St., Philadelphia, Pa., or by using the Request Card at page 16. Circle No. 554.

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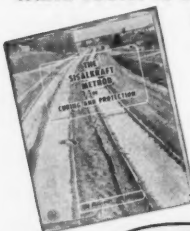
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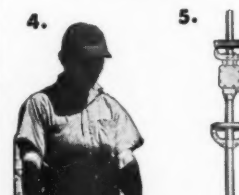
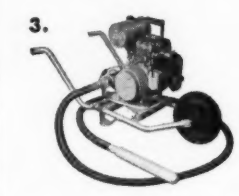
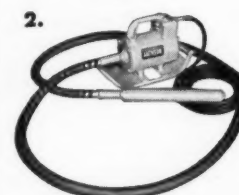
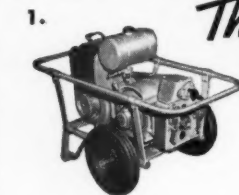
It strikes off to any crown, undercuts at curb or sideform, works right up to and around manholes and other obstructions. With it center construction joints may be eliminated and full widths (up to 30') poured. Requires only two men on widest slab, due to strong tendency to propel itself. It's the only screed that can be rolled back on 4 rollers for second pass. Contractor has only to secure plank cut to proper length and crown to be set for any job. Powered by Jackson 1.25 KVA Portable Power Plant.

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1. Power Plant used with Screed, 1.25 KVA. Others of 2.5 and 5 KVA capacity—all produce both single and 3-phase 110 V., 60 C. AC and have generators requiring no maintenance or adjustment. 2. Powerful, easy to handle electric Vibrator—shafts up to 28". 3. Finest of engine-driven flexible-shaft vibrators. 4. Revolutionary, fast, granular soil vibratory compactor. 5. Heavy-duty mass construction vibrator—a "must" on dams, etc. 6. Sideform Vibrator, mounts on finisher, saves better part of 2 men's labor. Write for "Pocket Guide" describing the entire line.

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Marshlands Reclaimed For Agricultural Use

(Continued from page 3)

of the slave labor system, the land became neglected. Timber sprang up as cultivation was abandoned, but the soil became enriched from periodic river floods that washed upland topsoil down to the coastal plain. Heretofore, the main economy of this district has been in the sparse growth of pine trees, but mechanized equipment like draglines, tractor-dozers, land levelers, and other earth-moving and earth-working machines has made possible the utilization of such areas for agricultural purposes.

No sweeping agricultural revolution is intended from this work of the Tidewater Experiment Station. The experimental tract will simply demonstrate to those interested the proper use of land for various soil conditions, and the advisable water-management practices. Farmers with land not favorably adapted for pastures and vegetable crops will realize they should leave such acres in woodland. On the other hand, large agricultural groups are interested in obtaining options on huge tracts of land to be used for intensive farming.

This southeast area will fill a harvesting gap that lies between the southern Florida and California marketing periods. Farmers in the south Georgia area who are developing long fallow lands on a pattern similar to that of the Tidewater experiment, report gross income up to \$1,000 per acre per year, on some of their land. Freight-rate savings are also possible, for this area is 500 miles closer to the great northern and midwest markets than south Florida, and over 2,000 miles nearer than California.

Clearing, Grading, Drainage

Of the 180 acres on the experimental tract, 20 acres of pine have been left standing while the remaining area has been cleared. The Station strongly recommends that crop pasture lands be balanced with a stand of timber. After the pines were cut down and sold by the original owners, Gay's crew of the Soil Conservation Service cleared the brush from the land, while a contract was let for dozing out the tree stumps. On the latter work a local farm contractor employed a Caterpillar D8 tractor with a stump yoke. The SCS forces then leveled off the land, filling in the holes left by the stumps. This was done with an Eversman Automatic Land Leveler pulled by a rubber-tired farm tractor. The cleared and leveled tract was next disked and harrowed with conventional farm machinery.

Equipment at the Station includes two crawler tractors, an International T-9 and a Caterpillar R4, one John Deere and two International Harvester rubber-tired tractors, together with cultivating, fertilizing, and seeding machinery. While the clearing and grading were in progress, a Buckeye ¾-yard dragline dug the necessary drainage ditches. Biggest of the ditches is a 30-foot-wide canal that extends from the south end of the tract at the highway over ½ mile to the bay. Digging started at the lower end and proceeded to U. S. 17 where the Georgia State Highway Department will construct a deep culvert to carry the drainage water from the tract.

Ditching throughout the tract is of prime importance to water management and control. In general, ditches are dug to depths of 3, 4, or 5 feet, and are spaced from 100 to 600 feet apart, according to the permeability rate of the soil which is mostly very low. The capacity of the ditches is carefully studied, and in the marshlands the SCS men are concerned with such problems as diking, tide gates, and water pumps. Gay has secured a large pump

of the type used in draining swamps in Louisiana, and that may prove useful in some of the wetter marsh areas. This phase of the work is somewhat akin to land reclamation in the Netherlands that has been going on for centuries.

Where the soils are particularly poorly drained, vitrified-clay pipe is installed at various spacings and to depths as great as 5 feet. The pipe will serve not only as drains, but also as a control on the depth of water table through a system of subterranean irrigation. Supplemental irrigation is also being considered to provide for possible droughts that do occur at infrequent intervals. On this initial tract an 8-acre pond has been formed by damming a creek, thus providing water for irrigation. It has deep and shallow parts so that the water level may be lowered in the summer and food grown along the banks for consumption by water fowl during the winter when the pond is again filled with water. The pond will be stocked with fish.

Access Roads

Dirt from the ditch digging and pond excavation was used to build roads that crisscross the tract giving access to all parts of the 180 acres. The roads are elevated above the level of the ground, average 20 feet in width, and are

crowned so as to drain freely into the side ditches. They were constructed with the dragline, dozers, and three dump trucks to haul the material. Wire fences are also strung along the roads to keep the open-range cattle in that

(Concluded on next page)

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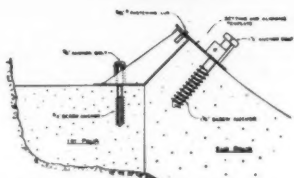
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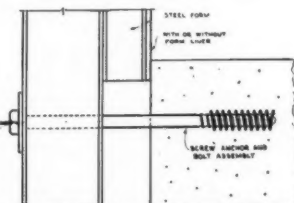
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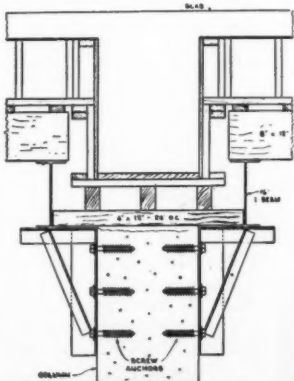
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Marshlands Reclaimed For Agricultural Use

(Continued from preceding page)

part of Georgia from getting into the pasture land and vegetable crops.

The soil is limed and divided into 3-acre plots for the assorted plantings. During the 1950 season, the major emphasis at the Station was on construction and land developments with the main features of the program to be established during the spring and fall of this year. By fall the entire tract is expected to be drained through the sys-

tem of ditches into the outlet canal, and the area will be ready for planting or already planted.

Pasture lands will grow fescue, Lespedeza, Bermuda, dallis, and carpet grasses, and various types of clover. Raising meat on the hoof in this climatic zone that permits year-round grazing offers fewer problems and less expense than in the northern and western parts of the country.

The vegetable areas are planted with a wide variety of truck crops that include among others cabbage, lettuce, onions, beans, corn, tomatoes, watermelon, and cantaloupes. All these fall



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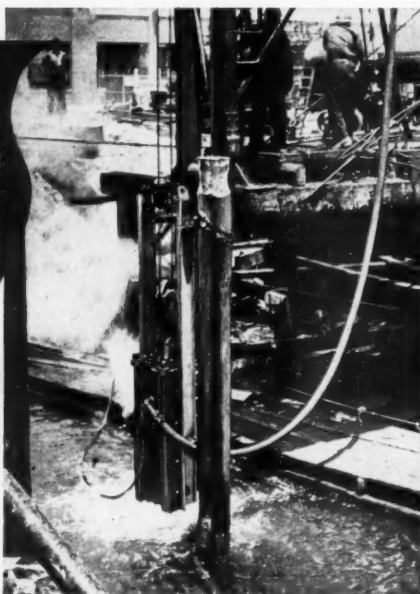
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McKiernan-Terry 11-B-3 Double-Acting Pile Hammer driving 85-ft. steel H-beams for the 4000-ft. bridge over Cerritos Channel, Terminal Island, Cal. Proctor & Kuhn, sub-contractors to United Concrete Pipe Corp.



1170 STEEL PILES

had to be driven under water during the construction of this longest, highest vertical-lift bridge on the Pacific Coast. 390 steel piles, 85 feet long, were hammered full length, without follower, into unstable soil to required elevation. At cut-off the anvil block or base of the hammer was 12 feet below the surface of the water. In addition, 780 shorter piles were driven for the lift-span piers. • McKiernan-Terry Double-Acting Pile Hammers were chosen for the job because (1) they were the first pile hammers developed for underwater driving and (2) they have held an unsurpassed reputation for underwater driving dependability through the years. • 17 sizes of hammers and extractors are available in the complete McKiernan-Terry line. Write for bulletin giving all the facts.

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Soil Conservation Service Photo

This dragline working at the Southeastern Tidewater Soil Conservation Experiment Station is digging an outlet canal to a creek as part of the water-control program.

under the general classification of observational planting, and will follow the general practices in vegetable-growing including rotation of crops.

Hope for the Future

As Project Supervisor Gay points out, there are up to 6,000,000 acres of gumbo lands and fresh-water tidal marshlands along the southeastern coast that are suitable for the growth of both vegetable crops and pasture crops. Enormous work would be necessary to clear, grade, and drain such large tracts of neglected land, but with the mechanized construction and farm equipment available today, the task is lightened. The Southeastern Tidewater Soil Conservation Experiment Station is pointing the way by which these valuable areas can be put to the optimum use for this country and the world.

For with the world's population increasing by 25,000,000 each year, the carrying capacity of the land must keep abreast of this increase. And with the United States being called upon continually to feed more than just its own population, large amounts of food must be produced to meet this demand. Apart from the favorable soil and climatic conditions, the Fleming tract is well located for this important experiment in agricultural development.

Industry is moving steadily to the south, resulting in increased population.

The food needs for this growth can be met off land that has long been captive to an overabundance of water. It seems fairly obvious that water control is simpler than irrigating desert lands with a diminishing water supply, as must be done along portions of the west coast. Hope for future food demands may well be found in this old, historic section which has been neglected and nigh forgotten for over 85 years.

New 2-Coat Method Protects Concrete

A two-coat method of protecting and preserving concrete surfaces has been announced by Lowebe, Inc., 1525 E. 53rd St., Chicago 15, Ill., manufacturer of Oncrete for concrete. This new method provides extra adhesion and moisture-resistance, the company says.

In this system, clear Oncrete is applied as a first coat, to provide an adhesive and moisture barrier between the concrete and a second coat of colored Oncrete. The coating may be used indoors or outdoors, on concrete, porous masonry, and metals. It is resistant to alkalis and moisture, and withstands heat up to 500 degrees, Lowebe engineers point out.

Further information may be secured direct from the company. Or use the Request Card at page 16. Circle No. 625.

... the new separable FLEXCO HINGED BELT FASTENERS



U. S. Patent No. 2,477,855

- ✓ For joining grader, trencher, ditcher and other earth moving conveyor belts.
- ✓ For belts 3/8" to 1 1/2" thick.
- ✓ A FLEXCO fastener that is HINGED. Has removable hinge pin.
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Order From Your Supply House. Ask for Bulletin HF 500.

FLEXIBLE STEEL LACING CO. 4408 Lexington St., Chicago 44, Ill.



The new Pengo 54-inch-diameter earth-auger in transporting position.

Larger Earth Augers

Three large sizes of the Pengo twin-helix earth auger, for use with heavy-duty power earth-boring machines, are now manufactured by Petersen Engineering Co., Santa Clara, Calif. Their diameters are 42, 48, and 54 inches; the company makes eleven other sizes from 10 to 36 inches.

The augers are designed to bore in any kind of soil, hardpan, or decomposed rock. The special alloy used in their pilot bits is heat-treated for full hardness. Replaceable points and pilot bits do the cutting and take the wear, the manufacturer explains. Both are replaceable in the field within a few minutes, without removing the auger from the machine.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 603.

Ferguson Project Engineer And D. C. Representative

Robert W. King has been appointed Chief Project Engineer for Harry Ferguson, Inc., Detroit. He is responsible for the execution of all design and functions pertaining to the company's tractors and implements.

Gordon K. Zimmerman, former Chief of Information for the Soil Conservation Service of the United States Department of Agriculture, has joined Ferguson as special Washington representative.

New Transmission Features Overdrive

Overdrive is incorporated in the new Model R-950-C 10-speed Road Ranger transmission made by Fuller Mfg. Co., Kalamazoo, Mich. This innovation adds a gear ratio of 0.779 to the high range, which incorporates additional ratios ranging from 2.10 to 1.00. The Road Ranger provides low-range ratios of 7.45 in first to 2.76 in fifth. Reverse gear ratios are 9.89 in the low range; 2.78 in high range. Model R-950-C is built, like the nonoverdrive R-95-C, in SAE No. 1 and No. 2 clutch-housing sizes.

The 10 selective gear ratios are said to be evenly and progressively spaced; there are easy shifts in 28 per cent steps; range shifts are preselected, automatic, and synchronized. The transmission permits the engine to operate in its peak horsepower range and reduces shifting by one-third, Fuller says. All manual shifts, up and down, are made in the conventional manner. The change from one range to the other—in either direction—is made by moving a button on the shift lever to preselect the desired range. The synchronized range shift occurs automatically as the shift lever moves through the neutral position. By using helical gears in all forward ratios, Fuller has reduced the weight of the transmission (804 pounds with standard controls) and the space it takes up.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 619.

Cleaning Solvents

Two effective cleaning solvents for use in the garage or shop are manufactured by The Curran Corp., S. Canal St., Lawrence, Mass. The first, called Gunk Dunk, is a carbon digestant for carbon and paint stripping. The second, Gunk P-96 spray, is a self-emulsifying self-scouring solvent for washing away grease.

Gunk Dunk, it is said, thoroughly strips gasoline, gums, lead, and paint and restores both the base metal and small brass parts to original appearance. Though it will work satisfactorily cold, it works much faster when warmed to 140 degrees F, the company says. Gunk P-96 spray may be brushed or sprayed on. It is said to remove all grease and dirt in a milky stable emulsion which will not clog sewers or

drains. One gallon of concentrate makes 10 gallons of spray when diluted with a low-cost petroleum distillate.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 640.

Cement Floor Finish

A 4-page illustrated bulletin about a cement floor finish of low water ratio

is available from General Floor Co., 110 E. 42nd St., New York 17, N. Y. It points out that Monorock includes a mixture of tough special aggregate which strengthens the concrete slab surface. Cast on dry, Monorock penetrates, interlocks, and becomes an integral part of the monolithic slab.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 582.



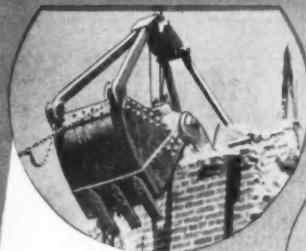
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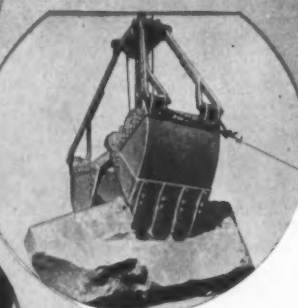
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Owens "lend a hand" in tearing down as well as cleaning up on demolition jobs.

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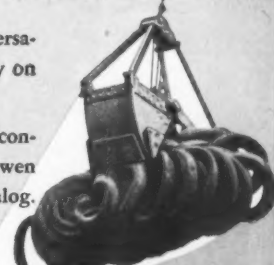
Tremendous closing power is graphically illustrated in this rock handling operation.



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More than just buckets, "Owens" are Versatile Tools, earning their way, every day on jobs of widely varying nature.

Sound principles of design and rugged construction are paying dividends to Owen owners everywhere. Write for the catalog.



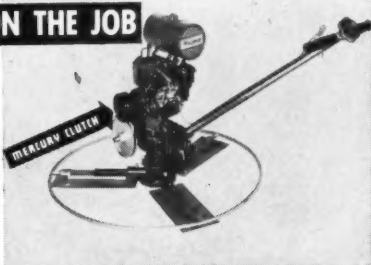
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CONTRACTORS AND ENGINEERS MONTHLY

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Hydraulic-Jack Use Speeds Pile Testing

There are a number of advantages to the hydraulic-jack method of pile testing, but the most important is saving in time and cost, according to Sam Miller, Superintendent for I. B. Miller Contracting Co., Inc., New York. The company has recently completed some pile tests on the site of the new Veterans Administration Hospital in New York City. The accompanying photo shows one of the piles tested to a load of approximately 200 tons.

The setup on the job was as follows. The Dudgeon 250-ton hydraulic jack was placed on a bearing plate resting



C. & E. M. Photo

Piles for a VA hospital in New York City are tested to a load of about 200 tons with concrete blocks on a beam grillage, and 250-ton Dudgeon hydraulic jacks.

on the top of the pile. Above this was a 4 x 4-foot 4-inch-thick bearing plate. Supporting grillage for the 1-ton cast-iron caisson blocks consisted of two layers of three 14 BP 73 beams set at right angles to each other. The beams were 24 feet long and supported at the ends by timber cribs. With the load centered above the jack, pressure was applied.

With the full load in place, the crane was free to take off on other work, since the testing job could be done by one man, contrary to the load-staging method. The Dudgeon jack was complete with hand-operated pump, gage, copper tubing, and forged-steel cylinder and ram. Settlement readings were taken at loads of 48, 72, 120, 144, 168, and 192 tons. The contractor pointed out that there is no delicate balancing of the loads or periodic addition of weights required with this method.

Four-Wheel-Drive Loader

A full description of the Model HM Payloader is given in an 8-page catalog prepared by Frank G. Hough Co., 822 Seventh Ave., Libertyville, Ill. It stresses the 4-wheel drive and power steer of this 1½-cubic-yard unit.

The catalog covers all construction and operating features, giving special attention to the tip-back bucket, hydraulic bucket control, fully reversing transmission, and operating controls. Photographs show the Payloader at work. Complete specifications and other engineering data are included.

This literature may be obtained from the company, or by using the Request Card bound in at page 16. Circle No 614.

Hot Water in Concrete Mix Causes Loss of Slump Air

A recent issue of "Highway Research Abstracts", citing Material Laboratories Report C-524 of the Bureau of Reclamation, and "Road Abstracts", a British publication, warns that the use of hot water in mixing concrete causes a loss of slump and entrained air, regardless of the resulting temperature of the fresh concrete. It points out that higher proportions of water and air-entraining agent are required to produce a given slump and air content when the mixing water is hot than when it is cold.

Will Be Executive Officer For Soil Conservation Group

On the first of next year, H. Wayne Pritchard will take over the duties of Executive Secretary of the Soil Conservation Society of America, Des Moines, Iowa. Since 1943 he has been Secretary for the Iowa State Soil Conservation Committee.



"Is it too late, Doctor?"

It's not too late for Americans who go to their doctors at the first sign of any one of cancer's 7 danger signals: (1) any sore that does not heal (2) a lump or thickening, in the breast or elsewhere (3) unusual bleeding or discharge (4) any change in a wart or mole (5) persistent indigestion or difficulty in swallowing (6) persistent hoarseness or cough (7) any change in normal bowel habits.

Guard yourself against cancer. Phone the nearest office of the American Cancer Society or simply write to "Cancer."

American Cancer Society

Cancer Can Strike Anyone

Give and keep giving to conquer cancer. Every dime helps teach new thousands how to recognize cancer and what to do about it. Every quarter helps support research scientists seeking the cause and cure. Every dollar helps provide facilities for treatment and care.

"CANCER," Local Post Office

GENTLEMEN: Here's my \$..... to help fight cancer.

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Panel with steel ribs every 12 inches are recommended for heavy pressure. Ribs allow 1500 pounds pressure per square foot.

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V-Blade Sno-Plows for all sizes and makes of motor trucks—also tractors, motor patrols and locomotives.

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This Littleford "Spray Master" Pressure Distributor with its Full Circulating Vacuum Flow Spray Bar applies asphalt, tar, emulsion or road oil with such ease and at such a low cost, it's amazing. It's engineered to give Highway Departments and Contractors the labor-saving unit that insures less expenditures for those black-top roads, highways and streets. Remember when purchasing Black-Top Construction units, LB means Littleford Bros. and Lesser Budgets for the best equipment.

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Distributor Doings



In a corridor of the Edgewater Beach Hotel, Chicago, during the AED's mid-summer meeting, ARBA President Paul Reinhold chats with Jack Handle, AED Field Secretary.

Dealers in a Mobilized Economy

Over 200 construction-equipment distributors attended an overgrown bull-session in Chicago at the end of June. Known more formally as the Associated Equipment Distributors' Mid-summer Meeting, its theme was "Are You Still Running Your Business?" in this mobilized economy. There were few speakers and no panels or scheduled forums at the two-day gathering; mostly, distributors just put their feet under the table and talked problems.

A few speakers, however, sparked the discussion. Two on the morning of the first day discussed operating under Government controls. They were Harold F. Hess, Executive Vice President, Construction Industry Manufacturers' Association; Joseph F. King, AED Washington representative; and Julien R. Steelman of Koehring Co., 1951 President of CIMA. Steelman spoke of the necessity for controls, much as businessmen dislike them, and called for allocation of all basic materials.

After lunch, at which they heard radio commentator Clifton Utley analyze American and Soviet diplomacy in the Korean War, the distributors split up into six discussion groups, each moderated by an AED regional director.

At the morning session of the second day, Paul Reinhold of Atlas Equipment Corp., President of the American Road Builders' Association, talked on the necessity of a successful iron and steel scrap drive. He warned distributors that it is important for them to keep

their yards cleared of all possible scrap. Harry J. Hush of Griffin Equipment Corp., New York, who is AED Executive Vice President, reported on the work of the AED National Affairs Committee. That afternoon delegates asked questions on various distributor management problems.

Bob Lowe of Lowe Machinery Co., Chicago, headed the program committee for the midsummer meeting at the Edgewater Beach Hotel. He was aided by C. F. Halladay, Sioux Falls, S. Dak., Chairman of the AED Advisory Board; and Miner Doolen, Telford Equipment Co., Lansing, Mich.

Open House at New Dealer Plant

An open house for a new plant is always a welcomed event. And when it



Ben Chernin's new plant, a dual-type Quonset, has an efficient layout and looks good. It fronts 375 feet on New Jersey's Route 25.

signifies the expansion of a moderate-size business it is even more welcomed. It's nice to know that the enterprising "little guy" can still get a fair start and, if he follows it up with hard work and sound policy, can turn that start into a healthy and satisfying business.

Ben Chernin has been in the equipment business a long time, but it's only these past six years that he has had

his own outfit. He started North Jersey Equipment Co. in July, 1945, in an oversized garage at 343 Elizabeth Ave., Newark, N. J. The start was small, about as small as it could be and still net a living. There was Ben, one salesman, one service man, and a book-keeper. But by using good sound business practice, much of which he learned

(Continued on next page)



Closeup of Bethlehem Reinforcing Bars installed in culvert. The Bethlehem Bar has high, closely spaced lugs to minimize slippage at working loads.

8 Miles of Relocation on U.S. 15

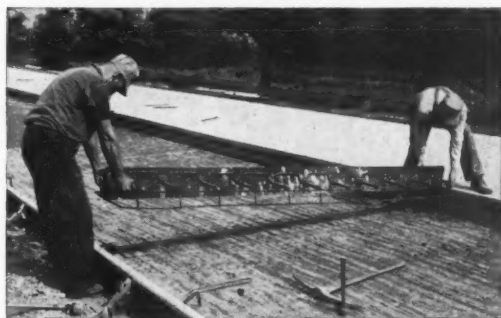
Eight miles of U.S. Route 15, between Liverpool and Amity Hall, Pa., was recently relocated under a project authorized by the Pennsylvania Department of Highways. The new 4-lane divided highway is free of sharp curves and steep grades. Its construction included the erection of 12 small bridges or culverts, as well as extensions for two existing structures. Contractor for the project was John H. Swanger, Inc., Lancaster, Pa. Bethlehem furnished bridge reinforcing, dowel units, bar mats and guard rail.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

STEEL FOR HIGHWAYS

Dowel Units • Reinforcing Bars • Bar Mats • Guard Rail
Guard Rail Posts • Wire Rope and Strand • Pipe
Hollow Drill Steel • Spikes • Bolts and Nuts
Timber Bridge Hardware • Tie-Rods
Sheet- and H-Piling • Fabricated Structural Steel



Two men can handle Bethlehem Dowel Unit with ease. The unit holds dowels in accurate alignment in concrete slabs, both horizontally and vertically.



Bethlehem Dowel Units nest conveniently, take little space at Swanger's batching plant. Assembled units in foreground are ready for installation.

HENRY . . . BUILDERS OF EARTH-MOVING EQUIPMENT

HENRY HYDRAULIC BACKHOE

Speed up and cut costs on every digging job. Easy to operate. Bucket has 7' digging depth . . . maximum reach 11' and swings 60° to either side. Bucket sizes 12", 14", 16" and 18".



HENRY HYDRAULIC SCRAPER

Digs, Hauls, Dumps, Spreads. Saves time and labor. All steel constr. Fully guaranteed. Five models from 1 1/4 yd. to 6 yd. capacity.



HENRY HYDRAULIC BULLDOZER

Inside pushbeam permits use of shorter moldboard, giving tractor added reserve power. Henry Dozer DI-84-9 for Int'l. tractor T-9 or TD-9. Henry Dozer DI-84-5 for Allis-Chalmers MD5B tractor.



HENRY Manufacturing Co., Inc.

1718 North Clay St.
TOPEKA, KANSAS
Write for Complete Details

Distributor Doings

(Continued from preceding page)

during his association with Henry Lohse Co., Newark, he got the organization going.

Talking to Ben it's easy to see why he has fared well in an industry as competitive as the jungle. He's a genial soft-spoken man; makes you feel at home from the minute you step into his office. There is no high-pressure sales whizz here, just a good honest businessman who wants to help you out if he can—whether it's to sell a 6-cent bolt or a \$10,000 crane, or to tell you how you can get another season's use out of an old rig.

Ben Chernin doesn't have a lot of maxims for making a business successful. In fact he has just one: do a lot of hard spade work lining up good accounts, and then hold them. By holding them he means following up every sale with complete and consistent service of the machine. His salesmen check up on the service of a machine by making at least two follow-up calls within a month after the sale. Other dealers may be interested to learn that Ben has a high regard for the value of a rental-sales agreement on heavy machines.

The old garage was O.K. for the start of North Jersey Equipment, but it didn't have enough space for long. The new site fronting 375 feet on New Jersey's Route 25, is quite a bit larger, but there was one drawback: the ground was a marsh-overlaid fill, definitely unsuited to heavy structures. It seemed to Ben that Quonset huts, sturdy and roomy, but with very limited total weight, would be well suited to the ground conditions. After a conference with Great Lakes Steel Corp., he decided on a dual-type Quonset.

The building is 60 feet across and 100 feet deep. The front 40 feet is used for the offices and parts department; the remainder is the shop area. There is a 12-foot clearance above the offices for stock storage. The layout is really efficient. It looks good too. The spanking-white building is set 75 feet from the highway, leaving room for parking and landscaping. Cost of the place was about \$50,000.

North Jersey's staff, like its plant, has expanded in six years. Lewis Sel-



C. & E. M. Photo

At the open house of North Jersey Equipment Co. Second and third from the right, standing, are President Ben Chernin and his son Art, Vice President.

zer, previously with Hoffman Machinery Co., is Secretary-Treasurer. Art Chernin is Vice President. He came to work with his dad after three years as a Navy engineering officer. The company now has 3 mechanics, 2 helpers, a parts manager, a bookkeeper, and 5 salesmen.

Parts supply is a big item with any dealer, and North Jersey is no exception. A large portion of the stock is given over to parts for Unit cranes and shovels, one of Ben's leading accounts. All parts are checked in and out on a perpetual card-index system. Ben pointed out that a war economy delays parts delivery and therefore inventories have to be greater. This ties up capital, but the dealer who is on his toes has to do it to keep his customers satisfied.

While guests wandered about admiring the new plant, Ben was thinking about a few new things he needed. He mentioned plans for expansion: a separate steam-cleaning room and paint shop, a 100 x 30-foot brick building at the side for larger working quarters. Yes, you could tell Ben had already set his sights on the next six years.

Equipment Dealers—this is your department, so send us your news—all about your new plants, new lines handled, new staff appointments in your organization, etc.

ed, this personal contact has added up to a high rate of sales for a relatively small distributor.

Good Roads began handling Huber road maintenance equipment in 1949. In 1950 it sold 20 major units. Its territory takes in all of Georgia except 15 counties along the Florida state line. Fred Maggi is the fourth member of the 4-man firm. With 15 years of experience on all types of equipment, he handles the service needs of the firm's customers.

Three Dealers Enter Heil Fold

Three distributors have been welcomed into the Heil Co. marketing organization: Brake & Equipment Co., Inc., of Heil's home town Milwaukee, is now selling Heil bodies and hoists. So is Melvin L. Aston Welding Co., Inc., of Cincinnati. State Tractor & Equipment Co. of Phoenix, Ariz., is distributing Heil road machinery.

The three companies were formed between 1933 and 1940. Oscar W.

(Continued on next page)

Personal Contact Brings In Sales

In a recent issue, "The Huber News" threw a spotlight on Good Roads Machinery Co. of Atlanta, Ga., which has demonstrated that time on the road really pays.

President J. G. Burch and Vice President Ed Goble spend practically all their time visiting contractors and county officials throughout the Peach State, while Clay J. Logan, Secretary-Treasurer, manages the office. In the 4 years since the company was found-

**Heat 16 or More
Tampers and Smoothers
in 5 Minutes**



ASPHALT PAVING TOOL HEATERS

This rugged combination heater, with 3 kerosene burners, for bituminous pavement construction and repair work, heats all the tools you need; also melts a kettle of binder cement in 10 minutes. Ample capacity; pneumatic tires—easy trailing.

**Melt Tar • Asphalt
Pitch and Bitumens
Faster—with Less Fuel**



MELTING KETTLE

With its improved well type oil burner and internal tube heating system, delivers "hot stuff" as you need it. 40 to 165 gal. capacity; also with hand or power bitumen spray attachments for road and street patching.

Also ask for catalogs on Hauck Surface Heaters, Compound Melting Furnaces, Thawing Equipment and Concrete Heaters.

HAUCK MFG. CO.
116-126 Tenth St., Brooklyn 15, N. Y.

ROSCO
MINNEAPOLIS

ROAD and STREET CONSTRUCTION and MAINTENANCE EQUIPMENT



BITUMINOUS DISTRIBUTOR... Streakless application with pressure constantly and automatically maintained.



STREET FLUSHERS... Truck mounted or 2-wheel trailer type. Standard or custom built.



MAINTENANCE UNIT... For repair and secondary construction. Truck or trailer mounted.



STREET CLEANER... Settles dust as it cleans. Sweeps and washes the street.

OTHER ROSCO PRODUCTS: Road brooms—traction or powered... tar kettles... power pumping units.

ROSCO MANUFACTURING CO.
3118 SNELLING AVE. • MINNEAPOLIS 6, MINN.

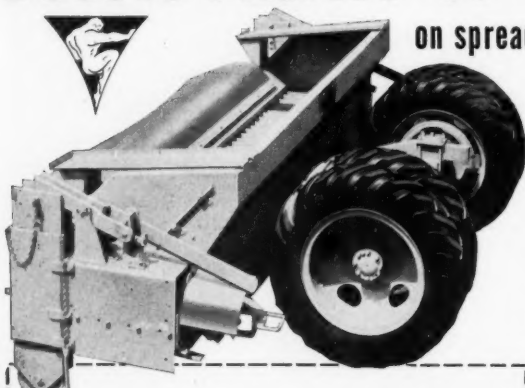
Ask Your ROSCO DEALER or write the factory for literature.



ROSCO TAR KETTLE

For heating and melting asphalt, pitch and all types of bituminous materials. Welded all-steel construction.

BOOSTS PROFITS \$99⁶⁰ per hour
on spreading of cement



Hercules Cement Spreader couples to any conventional dump truck, spreads bulk cement evenly in exact amounts desired over widths up to 10 feet at single pass. Two-man crew. During spreading operation (traveling 30 ft. per minute) this unit saves you 2c to 5c per sq. yd. in time, labor, and materials—or \$99.60 per hour.

Name _____

Address _____

City _____

State _____

Hercules

DEPT. 705

STEEL PRODUCTS CORPORATION, Gallien, Ohio

**MAIL THIS
COUPON FOR MORE
INFORMATION**

Distributor Doings

(Continued from preceding page)

Schroeder founded Brake & Equipment in 1933; now his firm employs over 40 people and last year moved into a new \$135,000 plant. Melvin L. Aston founded the company bearing his name in 1936; it has grown from a one-man to a 14-man organization. Roy Robinson heads State Tractor & Equipment, which succeeded Crawford Tractor Co. in 1940; some 45 employees are on the staff now.

New Distributors for Carver

Three more dealers are now handling pumps manufactured by Carver Pump Co., Muscatine, Iowa. They are: Complete Machinery & Equipment Co., Inc., 36-40 Eleventh St., Long Island City 1, N. Y.; Air Compressor Service, Inc., 1254 23rd St., N. W., Washington 7, D. C.; and Hoover Equipment Co. (formerly Southwest Machinery Co.), 1900 Linwood Blvd., Oklahoma City, Okla.

An Exclusive for Waco Scaffolds

C. E. French Co., Devon, Conn., holds exclusive distribution rights in Connecticut and the New York City area for Waco sectional steel scaffolding. The New York counties in the company's territory are Suffolk, Nassau, King, Queens, Bronx, Westchester, Rockland, Putnam, and Dutchess.

Wilson-Albrecht Co., Inc., manufacturer of the Waco line, has announced an expanded distribution program that will introduce scaffold outlets in a number of metropolitan areas. Cities under consideration are Portland, Oreg.; Seattle, Wash.; Salt Lake City, Utah; Oklahoma City; Houston; New Orleans; Knoxville and Nashville, Tenn.; and Detroit.

Three Appointed by Joy

One Kansas and two Oklahoma dealers were appointed this summer by Joy Mfg. Co., Pittsburgh. Oehlert Tractor & Equipment Co., Inc., now handles the Joy line in the Salina, Kans., area. The McCormick Machinery Co. has been named to the Tulsa, Okla., area, and The Townsco Equipment Co. to the Oklahoma City territory.



Feet are better than a right arm when it comes to operating this TD-14. Rish Equipment Co. fitted it with pedal controls for William B. Kirk when he lost his right arm. Rish Manager Hill, left, and Service Manager Morris check their special rigging.

You Can't Keep a Good Man Down

Nine years ago William B. Kirk of Kermit, W. Va., lost his right arm on an airport construction job in Maryland. "He's through as a tractor operator," they said.

But he didn't hear them. Or didn't pay any attention. He had an idea he could operate a crawler tractor with his feet, and he took his idea to Rish Equipment Co., International Harvester distributor of Bluefield, W. Va.

Manual controls on an International TD-14 crawler, with Bucyrus-Erie dozer, were replaced with a series of pulleys and wire cables—all pedal-operated. Today William B. Kirk is a going concern. He not only operates the tractor himself, but is running a successful contracting business.

Freeman & Sons Takes On Hyster

Freeman & Sons, Inc., of Miami, is exclusive dealer for Hyster lift trucks, mobile cranes, and Straddle Trucks in 13 counties of south Florida: Dade, Monroe, Collier, Broward, Palm Beach, Hendry, Lee, Glades, Martin, Okeechobee, Saint Lucie, Indian River, and part of Charlotte.

The late Harley J. "Cap" Freeman organized the company in 1912. His work has been carried on and expanded by E. H. Freeman, President and Gen-

eral Manager, and R. D. Freeman, Secretary-Treasurer. The company operates a large plant on Second Avenue, N.E., in Miami, and has recently completed a new plant in Jacksonville which sells, services, and supplies parts primarily for material-handling equipment. J. C. Holloway has been the Jacksonville branch manager for the past 20 years.

Other members of the organization include B. B. Benjamin, H. L. Freeman, H. E. Kopplow, Frank H. Harris, M. M. Johnson, and R. E. Courtney.

Cat Distributor Has Reorganized

Southwest Machinery Co., Oklahoma distributor of Caterpillar products and allied lines of equipment, has been reorganized into two corporations. One of these is the Hoover Equipment Co. which will serve the western division of Oklahoma.

R. L. Hoover, former President of Southwest Machinery, heads the newly organized Hoover Equipment Co.

(Concluded on next page)

JOYCE JACKS Chosen for Safety

BY E. W. LaPLANTE COMPANY

"We demand an exceptionally high factor of safety in all our moving operations... that's why we selected Joyce Speed Powered Air Jacks to move this 1,500 foot, 4,000 ton Savannah River Bridge 17 feet straight up! Sixteen Joyce Air Jacks controlled by five men, easily completed the project in two months with no injuries or damages. Traffic continued at all times."

KENNETH F. ADAIR, pres. and gen. manager
E. W. LaPLANTE COMPANY
MOVING ENGINEERS



VERSATILE JOYCE AIR JACKS SAVE YOU MANPOWER!

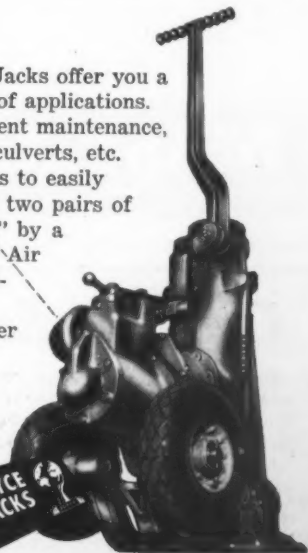
Joyce Air Jacks offer you a multitude of applications, ranging from heaviest equipment maintenance, and moving operations to pushing culverts, etc.

One man actuates "Y" valves to easily control the speedy operation of two pairs of these jacks. "Speed Powered" by a heavy duty Ingersoll-Rand Rotary Air Motor, Joyce Air Jacks are available in 50, 75, and 100 tons! Reliability of factory service further guarantees the dependability of these remarkable air jacks.

For complete information, write for bulletin 191-J today!

THE JOYCE-CRIDLAND COMPANY
DAYTON, OHIO

Joyce builds a complete line of ratchet jacks, screw jacks, hydraulic jacks, shoring jacks, and trench braces—3 to 100 ton capacities.



...AND YOU'RE MONEY AHEAD

From stockpile or windrow this speedy, sturdy loader makes fast work of any loose material. Users like the idea that it requires only one man to operate it—that it puts away 3 to 5 yards per minute—that it gets from job to job at truck speeds. You'll like it, too, if you'll let it demonstrate what it can do!

Send for complete specifications—Folder 947-105

EAGLE
JAW CRUSHERS • IMPACT BREAKERS
PULVERIZERS • CONVEYORS • LOADERS
CRUSHER CO., Inc. GALION OHIO-U.S.A.

Data on Clay Products

A condensed 4-page bulletin of interest to architects, contractors, and builders has been issued by The Robinson Clay Product Co., 65 W. State St., Akron 9, Ohio. It details and illustrates the broad range of clay products made by Robinson. Brief specifications are provided for vitrified-clay pipe, perfor-

ated clay pipe, Skip-Pipe, Staminite pipe, clay liner plates, clay flue lining, chimney tops and bases, vitrified-clay meter boxes, Lap-Lok wall coping, and septic tanks with burned-in baffles. Dimensions and diagrams are included in the bulletin.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 694.

**IT'S DOLLARS and SENSE
TO SALVAGE YOUR
WORN EQUIPMENT...**

Rebuild GYRATORY CRUSHERS with MANGANAL

U. S. Patents 1,876,738 - 1,947,167 - 2,021,945
11% to 13% Manganese-Nickel Steel

ROUND APPLICATOR BARS

- YOU SAVE DOLLARS by replacing worn metal with MANGANAL. It's faster and more economical.
- YOU MAKE SENSE by rebuilding your GYRATORY CRUSHERS with MANGANAL because they usually outlast new ones.
- MANGANAL workhardens under impact and abrasion to 550 Brinell . . . tensile strength up to 150,000 P.S.I.
- MANGANAL Round Applicator Bars are available in 11 sizes for all degrees of wear.
- For greater strength and longer wear attach with MANGANAL Bars or Special TITE-KOTE Electrodes.

FREE

Literature on the latest methods for Speedy and Economical Repair of Worn Equipment.

Name of Nearest Distributor Upon Request.

STULZ-SICKLES CO.

SOLE PRODUCERS
91 N. J. Railroad Ave.
Newark 5 N. J.

BUY MASTER TO STEP-UP CONCRETE FINISHING PROFITS

1 MASTER SCREED
Strikes-off and Compacts
6,000 sq. feet per hour.

2 MASTER TURN-A-TROWEL
Finishes 800 sq. feet
per hour.

FOR FASTER STRIKE-OFF & VIBRATION

1 . . . the MASTER SCREED has no equal. No additional vibration required. All sizes adjustable. A quality product that saves labor, saves finishing, saves cement. Write for MASTER SCREED Catalog No. 492.

FOR SMOOTHER, EASIER FINISH

2 . . . the MASTER TURN-A-TROWEL provides quick changing from wide compacting trowel to trowel finishing. Covers more area with more paste brought to surface for faster final finish. Write for MASTER TURN-A-TROWEL Catalog No. 939.

MASTER

BETTER PRODUCTS FOR BIGGER PROFITS

MASTER VIBRATOR COMPANY
101 Davis Avenue, Dayton 1, Ohio

Check the Red Request Card!

For further information on the new equipment, new materials, and new literature described in this issue of Contractors and Engineers Monthly, check the item number on the Red Request Card bound in at page 16. No obligation, of course, and we will forward your request directly to the manufacturer.

Contractors and Engineers Monthly
470 Fourth Avenue, New York 16, N. Y.

Distributor Doings

(Continued from preceding page)

which maintains offices, as well as parts and service shops, in Oklahoma City, Hobart, and Woodward. The home office is at 1900 Linwood Blvd., Oklahoma City.

Other officers of the Hoover Equipment Co. include James T. Hoover, Vice President and Sales Manager; and Blanton W. Hoover, Vice President and Treasurer. All the personnel of Southwest Machinery's Oklahoma City office fill the same positions in the new company. Other executives are N. G. LeVan, Comptroller; Jay Goss, Purchasing and Advertising Manager; Phil A. Braun, Parts Manager; Spencer Long, Assistant Parts Manager; Doug Sopher, Service Manager; and J. P. Garrett, Office Manager.

Hoover Equipment Co. sells and services a complete line of Caterpillar tractors, diesel engines, motor graders, and earth-moving equipment, as well as other related items in the construction field.

Six More Cleco Distributors

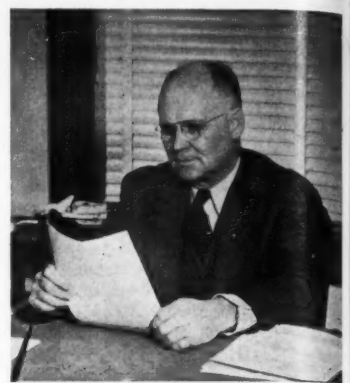
Six more firms have been added to the roster of distributors for Cleco and Dallett air tools and accessories made by the Cleco Division of the Reed Roller Bit Co., Houston. They are Red Arrow Sales Corp., Madison, Wis.; Martin Mfg. Co., Los Angeles, Calif.; Knox-Tenn Equipment Co., Knoxville, Tenn.; Highway Machinery & Supply Co., Inc., Richmond, Va.; Sterling Sales, Inc., Worcester, Mass.; and Walner Welding Supply Co., Duluth, Minn.

Cummins of Connecticut Expands

J. A. Mango, President of Cummins Diesel Engines of Connecticut, Inc., starts his 16th year as a dealer by announcing plans to increase service facilities at the Hartford headquarters. In addition to new tools and equipment, 7,500 square feet will be added to the shop area located at 37 Airport Road, Hartford.

Four More Dealers for Termite

Recent additions to the distributors handling Termite rotary masonry drills for Termite Drills, Inc., Pasadena, Calif.,



Shown here at his desk is R. L. Hoover, President of the newly organized Hoover Equipment Co., Oklahoma City, Okla. Mr. Hoover has been a distributor of Caterpillar products for almost 30 years. He started in early 1932 with H. W. Cardwell Co. of Oklahoma.

are: Virgil Heck Equipment Co., Louisville, Ky.; Triangle Plumbing Supply Co., Staten Island, N. Y.; Herbert A. Hanson, Aurora, Ill.; and Building Specialties Service, Boston, Mass.

Excavator for Tractor PTO

A 4-page bulletin describing the Model EX-101 excavator, a tractor-powered hydraulically operated unit, is available from Pippin Construction Equipment Co., Inc., White River Junction, Vt. Job illustrations show the unit digging, shoveling, and loading. It is designed for mounting on Ford or Ferguson tractors and may be adapted to other tractive units.

This literature may be obtained from the company, or by using the Request Card that is bound in at page 16. Circle No. 588.

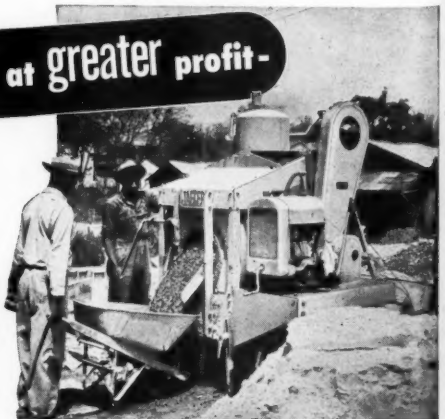
Pipe-Tool Operating Guide

A 4-page operating guide, designed to help the user secure the best possible results from his portable pipe and bolt machines and hand pipe tools, has been prepared by Beaver Pipe Tools, 333 Dana Ave., Warren, Ohio. It is a real trouble-shooter's guide pointing out specific methods of locating and correcting pipe-machine troubles. It covers threading, chucking, cutting, reaming, etc.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 612.

for more jobs at greater profit -

**Pour Better
Concrete
Faster with a
Jaeger!**



Jaeger 6-S, 11-S and 16-S power-loading mixers pour better concrete because their mixing drums give famous criss-cross, double mixing action that guarantees high-strength, uniform quality concrete. They pour it faster because (1) loading skips automatically shake batches into drums—no pounding, no scraping, minutes saved; and (2) drums, blades and discharge chutes are especially designed for swift, clean discharge. All this means more concrete per day and per wage dollar. Get the details—write for Catalog M-10.



And, for the small-job contractor, there's the 3 1/2-S Tiller, with V-bottom "Dual-Mix" drum.

THE JAEGER MACHINE COMPANY

701 Dublin Ave., Columbus 16, Ohio • Distributors in 130 Cities in the U. S. and Canada

Mountain-Top Runways To Take Heavy Planes

Constructed of Gravel Subbase, Thick Macadam Base, and 2½ Inches of Hot Mix; Will Take 45,000-Pound Wheel Loads

ON Memorial Day this year a new Class IV airport on top of Mt. Ettrick in Broome County, N. Y., was opened and dedicated. Its mile-long macadam-base runways are designed to carry the largest commercial aircraft flying. A test ride over them in a Jeep at full speed indicates that planes serving Binghamton, N. Y., and surrounding communities will have a smooth landing strip with unlimited horizons.

The \$4,000,000 project on an 854-acre tract of virgin mountain territory was financed jointly by the Civil Aero-

nautics Administration and Broome County. S. P. Carmen of Binghamton, and Seelye, Stevenson & Value of New York designed the airport and took charge of construction.

The site was prepared, starting in April, 1948, by D. W. Winkelman Co. of Syracuse, N. Y., which moved 2,600,000 cubic yards and installed 25,500 feet of 12 to 36-inch drainage pipe at a contract price of \$2,075,000. Binghamton Construction Co., Inc., of Binghamton, N. Y., was awarded the \$1,250,000 contract for paving, water supply, sanitation, seeding, etc.

Design

There are two runways at Broome County Airport—one 5,600 and the other 5,000 feet long, with longitudinal grades of 1 per cent and 0.2 per cent respectively. Both are 150 feet wide and have a 1 per cent lateral slope. They are designed to carry single-wheel loads up to 45,000 pounds.

The runways proper are built up of 6 inches of bank-run gravel subbase, 8 inches of dry-bound limestone macadam, and 2½ inches of hot-mixed asphaltic concrete. The taxiways and aprons, and the 500 feet at each end of the runways, consist of 9 inches of gravel, 8 inches of macadam, and 2½ inches of hot-mix. Paving quantities amounted to 285,000 square yards for runways, taxiways, and aprons; and 25,000 square yards for access roads and parking areas.

All in all, Binghamton Construction Co. had to truck 88,000 tons of material up a steep and winding road to the airport from the Chenango River. It had to bring in 58,000 tons from Jamesville, N. Y., 78 miles away. And it needed 30,000 tons from a quarry 20 miles away. It was no mean transporta-



Macadam Pavements, Inc., Photo

An Apsco elevating spreader lays crushed limestone for an 8-inch macadam base course at Broome County Airport, N. Y.

tion assignment.

The gravel subbase was spread by power maintainers and compacted by 10-ton and pneumatic rollers to 95 per cent densities. Then came the macadam-base work.

Macadam Base

Crushed limestone from the Solvay Sales Division of Allied Chemical & Dye Corp. and from N. R. Corbissello Quarries at Binghamton made up the dry-bound macadam base. Ninety to 100 per cent of the stone passed a 2½-inch-square opening; 25 to 60 per cent, a 1½-inch opening; and 0 to 10 per cent, a ¾-inch opening.

An Apsco elevating spreader laid the stone, and an International vibrator and 10-ton 3-wheel Buffalo-Springfield rollers filled and compacted it. About half the macadam was laid in two courses. The other half, in accordance with a CAA supplemental specification, was laid in one completed course, with vibration to help nest the stone and jar the screenings into the voids. Temple spreaders attached to truck beds laid the screenings. After the base was thoroughly compacted and filled, it received a prime coat of Koppers RT-2 at the rate of 0.22 gallon per square yard.

Hot-Mix

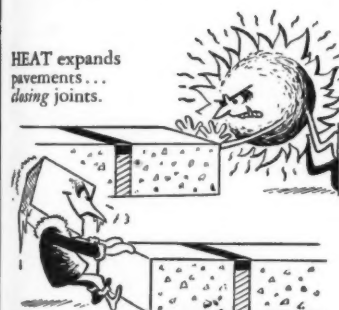
At the site the contractor erected a new Cummer asphalt plant, with an oil-

heating system, to mix the 43,000 tons of asphaltic concrete required.

The first 1¼-inch course of hot-mix consisted of crushed limestone and

(Concluded on next page)

Where weather extremes meet...



Flintseal
is the
BIG NAME IN JOINT-SEALING!

Mile after mile of Flintseal highway joints prove that this rubber asphalt thermoplastic joint-sealing compound has well earned its great reputation!

Engineers and contractors now know that concrete pavements, joint-sealed with Flintseal, last years longer than when ordinary materials are used.

Flintseal adheres tenaciously, does not lose bond at low temperature or flow in hot weather... remains extensible and compressible through complete cycles of expansion and contraction of the concrete.

Specify Flintseal Hot-poured
Joint-sealing Compound
(Fed. Spec. SS-F-336a)

You will obtain more trouble-free mileage of concrete pavements by specifying Flintseal... the big name in joint sealing.

Write for Free, illustrated,
descriptive Booklet

Complete technical data and specification procedures are available also upon request.

THE FLINTKOTE COMPANY
Industrial Products Division
30 Rockefeller Plaza
New York 20, N. Y.



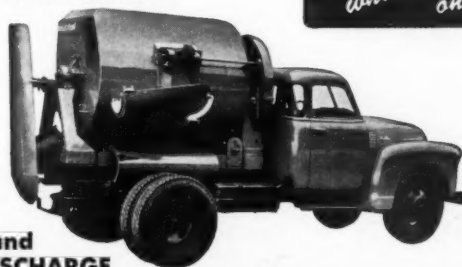
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Products for Industry

*Reg. U.S. Pat. Off.

Faster charging, due to open top stationary drum

Mixing while loading
with visible control

"You see what goes on"



REAR and
SIDE DISCHARGE
reduces delay on
arrival at job.

TRANSPORT TRUCK MIXERS
are the answer for CENTRAL
or TRANSIT MIXED CONCRETE

ILLUSTRATED BULLETIN MAILED ON REQUEST

**CONCRETE TRANSPORT
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Phone Flanders 7800
4984 FYLER AVE., ST. LOUIS 9, MO.

Serving the CONCRETE INDUSTRY 20 YEARS



AUTOMATIC SAVING IS SURE SAVING BUY U. S. DEFENSE BONDS

Here Is Your Nearest

VULCAN

Distributor

of Pile Driving

Hammers and Extractors

- R. S. Armstrong & Bro. Co., Atlanta, Ga.
- Balzer Machinery Co., Portland 14, Ore.
- Herman M. Brown Co., Des Moines, Iowa
- Browning-Ferris Machinery Co., Dallas, Texas
- Browning-Ferris Machinery Co., Houston 1, Texas
- The Cameron & Barkley Co., Charleston, S. C.
- The W. I. Clark Co., New Haven, Conn.
- Coast Equipment Co., San Francisco 1, Calif.
- Contractors Machinery Co., Grand Rapids 2, Mich.
- Contractors Machinery Co., Detroit 3, Mich.
- Contractors Machinery Co., Kansas City 8, Mo.
- A. H. Cox & Co., Seattle 4, Wash.
- The Day & Maddock Co., Cleveland 2, Ohio
- A. F. Deane Co., Indianapolis 2, Ind.
- J. E. Dilworth Co., Memphis, Tenn.
- Dravo-Doyle Company, Pittsburgh 33, Pa.
- Edward C. Flaherty Co., Long Island City 1, N. Y.
- General Supply & Equipment Co., Baltimore 18, Md.
- Gibbs Corporation (Equip. Div.), Jacksonville 1, Fla.
- Harron, Rickard & McCone Co., of So. Calif., Los Angeles
- Hendrie & Bolthoff Co., Denver 17, Colo.
- Honolulu Iron Works Co., Honolulu 2, T. H.
- Hunter Tractor & Machinery Co., Milwaukee 3, Wis.
- Wm. T. Johnston Co., Cincinnati, Ohio
- Llewellyn Machinery Corp., Miami 30, Fla.
- Lorenz Equipment Co., Columbus, Ohio
- T. S. McShane Co., Omaha 8, Nebr.
- Morgans Incorporated, Savannah, Ga.
- North Carolina Equipment Co., Raleigh, N. C.
- Perrin, Seamans & Co., Boston 10, Mass.
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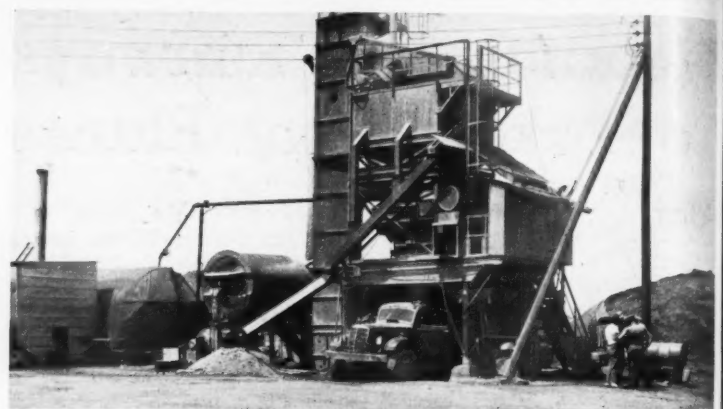
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Macadam Pavements, Inc., Photo

An Adnun Black Top Paver laid the hot-mix at Broome County Airport; a 3-wheel Buffalo-Springfield roller compacted it.



Macadam Pavements, Inc., Photo

This Cummert asphalt plant mixed the 43,000 tons of asphaltic concrete needed for the new mountain-top airport.

Mountain-Top Runways To Take Heavy Planes

(Continued from preceding page)

natural sand bonded with 120 to 150-penetration Socony asphaltic cement. The second course was similar and was sealed with 0.22 gallon of RC-2 per square yard plus gray limestone chips. Pure-white chips from Harry T. Campbell Sons Corp., Texas, Md., went into the 10-foot-wide strips along each side of the runways. All chips passed a 1/4-inch sieve; the average application was 12.5 pounds per square yard for the gray, and 16 pounds per square yard for the white.

An Adnun Black Top Paver laid the hot-mix, and 3-wheel 3-axle Buffalo-Springfield rollers compacted it. A Grace spreader laid the chips, and they were embedded by a rubber-tire roller. The paving contract was completed in 1950.

Other Facilities

The new airport has a 2-story concrete, brick, and stone administration building which supports a structural-steel and aluminum-plank tower with a control cab on the sixth floor. The building cost approximately \$350,000. The airport's \$100,000 lighting system includes high-intensity lights on the 5,600-foot instrument runway and medium-intensity lights on the 5,000-foot runway and all taxiways. All areas not occupied by paving, buildings, or sidewalks are seeded.

Edwin P. Smith was Superintendent for Binghamton Construction Co.; Don-

ald Davis is President of the firm. Karl Yost was Resident Engineer in charge

of the project for the consultant, Seelye, Stevenson & Value.



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470 Fourth Ave., New York 16, N.Y.

New Mexico Builds Research Laboratory

Albuquerque Facility Now in Service; Southwestern State Focuses Attention on More Thorough Testing

By RAYMOND P. DAY
Western Editor

When 'Omer smote 'is bloomin' lyre,
'Ed 'eard men sing by land an' sea;
An' what 'e thought 'e might require
'E went an' took,—the same as me...
—Kipling

• WHEN he finished the quotation, the white-haired granddaddy of the New Mexico Highway Department sat back in his chair in the new Albuquerque Research and Testing Center, and lighted his pipe. With an old-timer like E. B. Bail philosophizing, this was good for a story.

Bail is the Materials Engineer of the Highway Department. He has seen highways built, rebuilt, and rebuilt again in his lifetime. Tough and wiry at an age when most men think of retiring, the old man gives the impression that he could whip his weight in mountain lions... especially when his lower jaw shoots out and his blue eyes blaze and he spits out his definition of "zero maintenance".

But today he was calm and happy. Recently finished was a spanking new \$126,000 materials lab. Things were humming along throughout the building. Possibly because Bail "went and took..."

"Yes, that's us to a T", he continued, puffing away. "We see something in the Highway Research Board abstracts, and if we 'think we might require' it, we take it. Fellows like Francis Hveem over in California do hundreds of thousands of dollars worth of good to other states like us. He pioneers, and we copy..."

That, too, is a Bail characteristic. He has done some pioneering himself, but with commendable humbleness he looks on his Highway Research Board associations with enormous appreciation. Bail is a member of the HRB's Committee on Flexible Pavement, but he swears "I get a lot more out of those discussions than I can put in."

If there is such an animal as a "typical engineer", Bail is it. He is an old mining engineer. Back around the early part of the century he worked for Anaconda Copper Co. near Butte, and he knows the lore of the Nevada gold fields as few men know it. Two years ago, when the WASHO held its annual meeting in Reno, Bail followed every inch of the Virginia City lode, thrilling his listeners with nostalgic descriptions of that bygone day.

In his own right, too, Bail is a good geologist. Thus when he became Materials Engineer for the New Mexico Highway Department in 1941, it was inevitable that research and testing of materials would be stepped up. All his life Bail had worked with parts of the earth's crust. So in 1950 alone, Bail's lab processed 25,000 samples. That was exactly the same number that had been processed in the 16 years from 1925 to 1941.

Lab Established in 1925

In 1925, the New Mexico Highway Department established its first lab in Las Cruces, at the New Mexico College of Agriculture and Mechanic Arts. Commercial laboratories had been making the tests up to this time, but that had not worked out too well, because it took too much time to ship the samples off to these labs, and wait for the reports.

It was a humble beginning. The lab occupied 3,750 square feet, and the col-

lege required, in payment for this space, that the Material Engineer conduct certain classes in his spare time. I. E. Birks was the first engineer in charge, followed by F. W. Weekes, who headed the civil-engineering department at A&M for a year or more. L. C. Campbell preceded Mr. Bail for a number of years.

In October, 1938, the Highway Department moved the testing laboratory to Albuquerque. About 5,200 feet in Hadley Hall on the campus of the University of New Mexico was set aside. It was soon too small. On February 12, 1949, a terrific gas explosion destroyed most of the building—at 7 a. m., fortunately, before people had come to work.

But Bail had been at work for a long time sketching, working up what he thought would be the finest yet the most economical laboratory money could buy. His sketches were turned over to John Gaw Meem, Hugo Zechner & Associates, the state architects, at Santa Fe. They, with the advice of the laboratory staff, completed the plans. The new structure was to have 10,750 square feet on the ground floor with 1,140 square feet in the basement.

The New Laboratory

On March 13, 1950, a contract was let to S. V. Patrick Construction Co. of Albuquerque to build the new laboratory. A site was chosen at 2206 Las Lomas Road, on the northeast corner of the University of New Mexico campus. It was 200 feet square, and took in a small sand and gravel hill which was leveled off. It made an excellent foundation.

The laboratory architectural style, in Indian Pueblo motif, blends beautifully with other buildings on the campus. Even the University decorative scheme was followed throughout.

The ground floor of the new structure consists of eight offices, a file room,

a library, a janitor's closet, equipment-storage room, a receiving room, gravel room, mechanical-analysis room, humid room, constant-temperature room, a general laboratory, soils laboratory, research laboratory, chemistry labora-

tory, oil and asphalt laboratory, special investigation room, flash room, and a dark room. The basement houses the boiler and cooling equipment; also a small machine shop. Toilet and showers

(Continued on next page)

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New Mexico Builds Research Laboratory

(Continued from preceding page)

for the laboratory personnel are provided.

Approximately 14,000 pounds of reinforcing steel were used in the 800 cubic yards of building concrete. Some 26 tons of structural steel and 32,000 pieces of cinder bricks and blocks went into the building. Laboratory furniture, replacing that destroyed by the 1949 explosion, was furnished by Denver Fire Clay Co. on a low bid of \$21,908.97.

By December 15, 1950, the building was finished and ready for occupancy. The lab people moved in from temporary quarters on South Yale Street. This was roomy. This was beautiful. This was more like a laboratory than anything they had ever seen before. It was going to be a pleasure to work here.

Variety of Tests Made

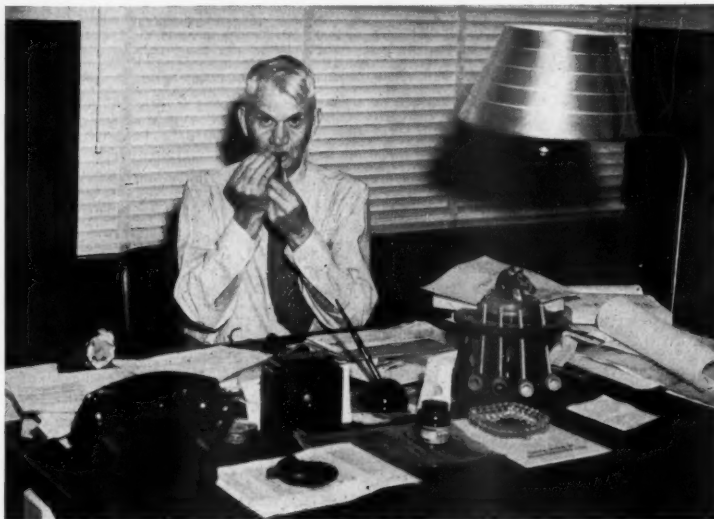
A variety of tests are made regularly by the new laboratory. Much of the work is with soils, gravel deposits for subbases, and concrete aggregates. But many other tests can also be run. The chemistry lab, for example, is fully equipped to do practically any analysis in inorganic chemistry. It has a wonderful line of reagents, complete testing equipment, and Becker Chainomatic analytical balancers so delicate they will weigh one ten-thousandth gram.

New Mexico is a semiarid state, with predominantly bituminous highways. It is therefore natural that much of the testing concerns soils and base materials. And that is where Bail's pioneering comes in, because his system is simple, clear, and of wonderful value to designers and construction engineers.

Traffic and Rainfall Charts Made

Some years ago, Bail was instrumental in devising two important charts. First was a rainfall or moisture chart for the state, which divided into four zones the various rainfall areas. These zones were as follows: white—less than 8 inches; yellow—8 to 14 inches; brown—14 to 20 inches; and red—more than 20 inches.

The second chart classified all state highways according to use. Those like U. S. 66, heavily traveled, were classified as red. Medium-traveled roads



C. & E. M. Photo

E. B. Bail, Materials Engineer of the New Mexico Highway Department, lights his pipe and discusses the progress of research.

were green. Lightly traveled highways were brown. The reason for this classification was obvious. Heavily traveled highways require a stronger base, and a better surface.

It is routine, now, to sample the soils over the entire location of a new highway. When the soil values are known, Bail then "knows how much gravel we've got to find". His men then go out and sample the countryside to find the best base materials, and in that connection, Bail explains one thing he's learned the hard way.

"Plasticity index is everything", he says vehemently. "If there's one conclusion I've made, that's it. It shows up everywhere; in roads that have failed, and those which have stood up. You've simply got to keep excess clay out of these subbases."

Bail learned it the hard way. Back about 1927, when the California Division of Highways was blacktopping some desert roads out around Barstow, Bail visited the work and recommended

(Continued on next page)

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C. & E. M. Photo

Two men in a soils lab of the new \$126,000 research building at Albuquerque.



C. & E. M. Photo

Assistant Chemist Joseph M. Eldodt is at work in the chemical laboratory.

that the same treatment could be used to improve some of the worn-out gravel roads in New Mexico. Money was scarce, though, so some of the bituminous treatment was applied to roads whose bases were too plastic.

"And those roads failed, dammit!" Bail exploded. "What else could they do? You can check some of those bases today—those we haven't fixed yet—and the whole PI story is there."

It is such a strong belief of his that Bail insists on plenty of samples of roadway and gravel-pit areas. The samples come in to the receiving room, where they go on an assembly-line testing system. A man makes up a card for each sample. Materials then go through a crusher if necessary, are screened, washed, analyzed, typed, checked for sulfate content.

From the testing data thus developed, Bail's men then make a strip map, by station, which summarizes soil classification by station, and shows other information which designers need. This is sent to Santa Fe to the Highway Department. A project sheet is also made up, summarizing every bit of information gained by the laboratory. This information is placed on the plans and is made available to the bidding contractors.

"There's no doubt this information has lowered contract prices," Bail says. "Contractors can make a much more intelligent bid when they have facts to

go by.

"Of course, some of them think I'm crazy when I recommend 12 inches of subbase in a rock cut, and only 6 inches 500 yards away on the top of a

dirt fill", he says, smiling. "But there's a good reason for it. You can even prove it mathematically if you want to."

(Concluded on next page)

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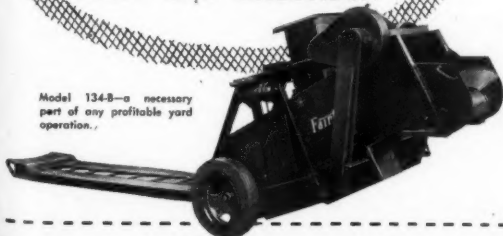
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New Mexico Builds Research Laboratory

(Continued from preceding page)

In connection with soil and subbase materials, Bail is conducting some extensive research to check New Mexico's designs against the R-values in Hveem's formula. So far, the values are checking very closely except in very bad soils. In bad soils, with 100 per cent saturation, Hveem's design formula would call for, say, 27 inches of subbase. In New Mexico they do not go above 15 inches.

"We can't seem to check the saturation condition", Bail explains. "For one thing, New Mexico doesn't build roads in trenches; we carry the subbase shoulder to shoulder to get better drainage. Now once in a while, if 'zero maintenance' neglects a highway long enough to allow holes to develop, water and snow will soak through a pavement and saturate the base."

"But the remedy for that isn't a thicker base; it's better maintenance. We're getting it, now. And if better maintenance can prevent the saturation of these low-type subgrades, isn't that the answer?"

He asked that question by letter to Hveem, sent the result of many samples, and California modified the lower end of its design formula. California, too, doesn't build roads in trenches, but unlike New Mexico, it has money enough to build thicker subbases over bad sections.

Better Pavements: More Research

Bail's department is stepping up its research and tests of materials enormously in connection with the design of flexible pavement. For many years, New Mexico was a bituminous-road-mix state, and that type of low-cost pavement was laid even on the first-line transcontinental highways. That picture is changing. More and more, the heavily traveled roads are being surfaced with hot-mixed asphaltic concrete.

In the pavement-testing laboratory, Bail has just about anything an up-to-date but modest laboratory should have. There is a Marshall device, a Hveem stabilometer, special machines for getting R-values in Hveem's design formula (the R-value is a measure of resistivity of material), and water-detection devices. Equipment is also there to check concrete materials, and Bail has even imported a delicate testing rig built by the U. S. Bureau of Reclamation which will indicate whether or not a rock will stand freezing and thawing. However, he still places the most faith in the old standby magnesium sulfate test, and uses the new-fangled thing to check results known through the older test.

One of the important questions often posed by field contractors is, "Why

can't I start my backfill around the concrete culverts? They're cured enough". Bail's men are currently studying the answer to that question, which is important for two reasons. From the contractor's point of view, the delay means lost time. From the state point of view, premature loading with heavy backfill might rupture the green concrete.

So Bail and his men have been checking the modulus of rupture at various times after the structures have been poured. Out of the testing rooms has come at least a partial answer to the question "Have we been wrong in our demands about curing time?"

Eighty per cent of the time, according to known results so far, the State has been right. About 6 per cent of the time it has definitely been wrong, and the contractors were penalized with lost time. The other percentage falls in a questionable range.

Can't Always Predict

Bail himself would be the first person to admit that laboratory answers are not always the final word, and he is perhaps one of the closest field observers among all research men. He figures he gets a lot of good answers when he goes afiel with his eyes open.

For example, laboratory tests often show that Type I cement is acceptable for structures. Field observations over a long period of time have indicated to Bail that something deleterious goes on occasionally when Type I is used. "I believe the tricalcium aluminate in Type I may do something harmful which we haven't been able to check", Bail explains. "So, we just use Type II cement in all our structures, and the trouble seems to be cured."

In the meantime, Bail is working hard to bridge the gap between laboratory research and practical field work. Resident engineers idolize him, and that's a pretty fair indication of the progress he has made in that direction. "But we've got a long way to go, not only in New Mexico, but in other states", Bail says. "I don't care how good a road builder you've got in the field, you can make him better if you can give him quick, simple ways to test and check his material as he put it in".

Some man in Maryland, whose name Bail cannot now recall, recently invented a small, simple machine for pulverizing hard clay with rock lumps in it. The machine is basically nothing more than a covered section of pipe, with several rubber-covered lead bars inside. When a tough sample is put in, a motor starts rolling the contrivance.

"In about 20 minutes there's your whole sample, ready to screen and analyze. Those doggoned lead-weighted bars clean that rock as pretty as you could ever imagine. And there's no dust, either. It's just what we've needed for a long time... say, you know that



"I've located that missing cribbing!"

fellow had a real head on him to invent that?"

We wondered how Bail got the machine.

"Well, I heard about it", Bail's smile was broad. "I wrote a letter to the HRB, got the dope, and as Kipling said, 'I went and took' it for my own use!"

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3/4" U. S. sieve		85-100	35-90													
#10 U. S. sieve		30-55	30-70													
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#200 U. S. sieve		8-15	8-20	30-	30-	40-	30-60	25-	45-	55-	65-	65-	40-	30-	40-	30-
Liquid Limit		25-	35-	30-	30-	35-	30-	40-	30-	30-	40-	29-	40-	50-	50-	50-
Plastic Range		6-	6-	7-	9-	11-	7-	16-	6-	11-	13-	17-	21-	21-	19-	19-
Dust Ratio		65-	65-													
Loose Thickness		0"	4"	6"	8"	10"	10"	12"	14"	14"	16"	16"	18"	20"	22"	24"
Red Compacted		0"	3"	5"	6"	8"	8"	9"	11"	11"	12"	12"	14"	15"	17"	18"
Green Compacted		0"	3"	5"	6"	8"	8"	9"	11"	11"	12"	12"	12"	12"	12"	12"
Brown Compacted		0"	3"	5"	6"	8"	8"	7"	8"	8"	9"	9"	10"	10"	10"	10"
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This fast design chart was Bail's invention.

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Through all of last winter, Vernon County Highway Department, Viroqua, Wis., used their rubber-tired C Tournadozer for heavy-duty snowplowing. Its mobility, power to clear deep drifts, and 19 m.p.h. travel speeds from job-to-job were major factors in setting the following, typically high records of production:

- 1** Opening highways drifted 6 to 10 ft. deep, the powerful 186 h.p. Tournadozer cleared an average of 2 to 3 miles an hour. "I like Tournadozer's maneuverability on this work," says County Hwy. Commissioner M. J. Roidt. "It can swing around anywhere without looking for a driveway."
- 2** Widening county roads in heavy, wet, partially-frozen snow, 3 to 6 ft. deep, Tournadozer averaged 10 to 15 miles an hour. Giant, low-pressure tires and adjustable runner shoe prevented damage to soft shoulders and road surface.
- 3** Clearing farm driveways, the "C" opened the access roads in far less time than did big, all-wheel-drive trucks.
- 4** In 600 hours of plowing, much of it through heavy, drifted snow which greatly slowed or even stopped other equipment, Tournadozer worked with 93% operating efficiency.

Tournadozer's record on summer dirtmoving assignments has been just as impressive. Used by Vernon County with a bulldozer blade, the "C" travels job-to-job under its own power . . . saves the assignment of truck and trailer . . . eliminates loading and unloading delays, trouble, and expense. For example, in one day, Tournadozer drove 7 miles and completed 3 jobs . . . cutting corners on 2 town roads and building a bridge approach. On other assignments, it grades for highways, dozes dirt, pulls a scraper, and tows a construction grader.

Give Tournadozer speed and versatility careful study from the standpoint of saving you time and trouble on year-around operation. Like Vernon County, you'll find this 19 m.p.h. Dozer on rubber a high production tool the year around . . . for your dirtmoving assignments, spring, summer and fall . . . and for plowing snow during the winter. Call your nearest LeTourneau Distributor for complete information.

Widening banks of wet snow along Vernon County Hwy. O and K, 15 miles northwest of Viroqua, Tournadozer averages 10 to 15 m.p.h. Note how vertical divider plate eliminates plowing snow back on road. Electrically-operated Snow Wing is available for benching.



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